EliteRAID ER104I & MobileRAID MR4I

SANS DIGITAL®

DETAILED USER'S MANUAL

Forewords

About this manual

Thank you for using products from Sans Digital.
This manual will introduce the Sans Digital iSCSI product. Before using Sans Digital iSCSI product, you are advised to read this manual first. All information contained in this manual has been carefully confirmed before printing, but the actual product specifications shall be in accordance with those at the time of delivery; any update to product specifications or relevant information may be found on www.sansdigital.com, and no separate notification will be made.

If you have any query regarding the products of Sans Digital, or you would like the latest product information, please contact us at support@sansdigital.com, and we shall give you a reply as soon as possible.

Copyright © Sans Digital. All rights reserved.

ER104I Quick Install Guide

1. Package Contents

After you open the outer package, make sure that the following items are in the box:

- ER104I product body
- AC Power Cord
- RS-232 Port Cable
- CD
- User Manual
- Accessory Kit

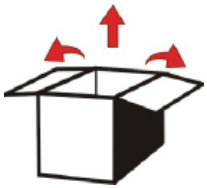
Management ethernet port network setting:

IP Address:	**192.168.0.1**
Subnet:	**255.255.255.0**
Username:	**admin**
Password:	**1234**

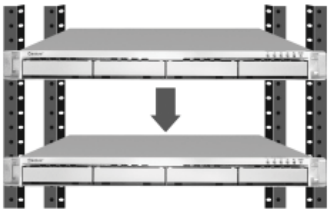
2. Hardware Installation

Please follow the procedures to complete the hardware installation of ER104I.

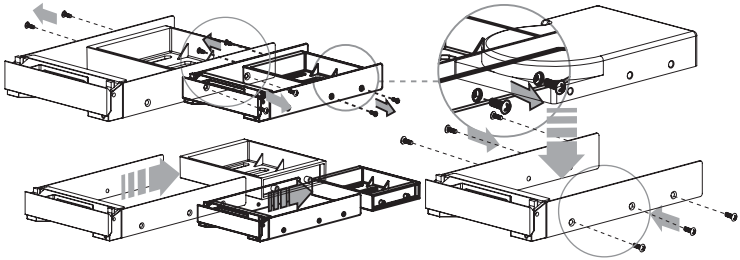
Step 1 Open the outer package and take out the product. (Make sure the related accessories and the product are not damaged or missing. If you have any questions, please contact the us, www.sansdigital.com or support@sansdigital.com)



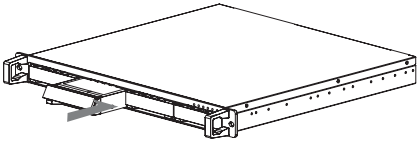
Step 2 Mount the product to the rack. Make sure that the ventilation fan is not obstructed and appropriate ventilation space is provided around the product. (Do not place the product to any environment that may cause damage to the product)



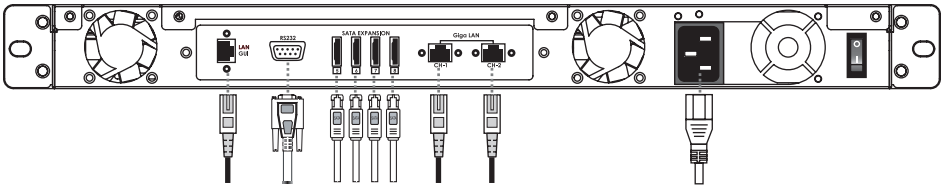
Step 3 Take out the tray and install your hard disk in it. Make sure to fasten the hard disk securing screws to prevent damages caused by unnecessary movement.



Step 4 Once the installation is completed, insert the tray back and fix it firmly in the proper place.



Step 5 Connect the cables to the corresponding ports. Make sure that you have connected the corresponding cables to two Gigabit ports, LAN or RS-232 port and Extension port (optional). Then connect the power cord.



Step 6 Hardware installation is completed. You can power on the system to start the related setup and application through LAN port or RS232 port. (Default account and password: admin / 1234, IP address: 192.168.0.1)

Complete! You may start the configurations of the system. Please refer to Chapter 4.

MR4I Quick Install Guide

1. Package Contents

After you open the outer package, make sure that the following items are in the box:

- MR4I product body
- AC Power Cord
- RS-232 Port Cable
- CD
- User Manual
- Accessory Kit

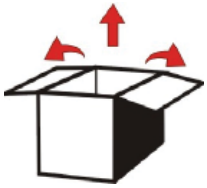
Management ethernet port network setting:

IP Address:	**192.168.0.1**
Subnet:	**255.255.255.0**
Username:	**admin**
Password:	**1234**

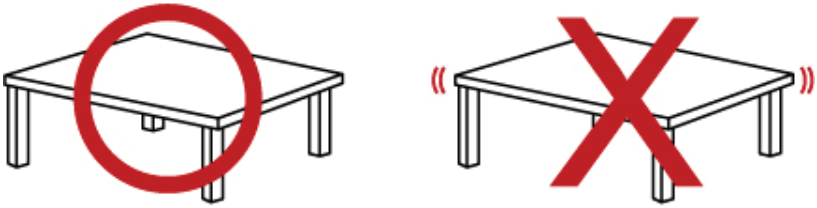
2. Hardware Installation

Please follow the procedures to complete the hardware installation of MR4I.

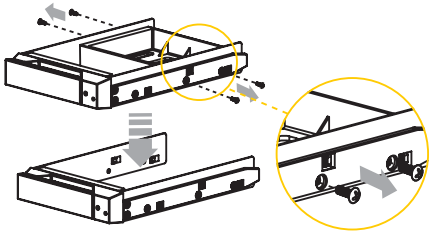
Step 1 Open the outer package and take out the product. (Make sure the related accessories and the product are not damaged or missing. If you have any questions, please contact the us, www.sansdigital.com or support@sansdigital.com)



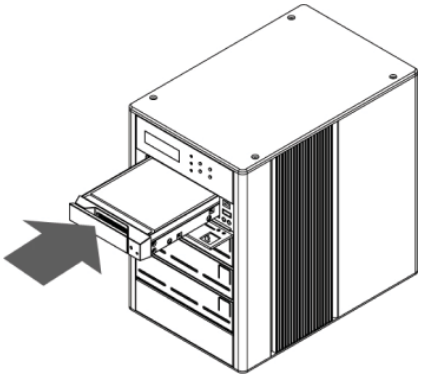
Step 2 Place the product on a flat and stable surface. Make sure that the ventilation fan is not obstructed and appropriate ventilation space is provided around the product. (Do not place the product to any environment that may cause damage to the product)



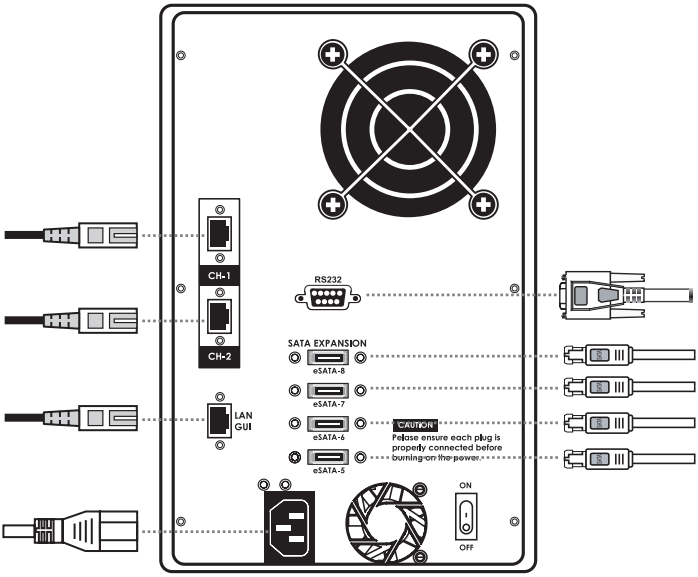
Step 3 Take out the tray and install your hard disk in it. Make sure to fasten the hard disk securing screws to prevent damages caused by unnecessary movement.



Step 4 Once the installation is completed, insert the tray back and fix it firmly in the proper place.



Step 5 Connect the cables to the corresponding ports. Make sure that you have connected the corresponding cables to two Gigabit ports, LAN or RS-232 port and Extension port (optional). Then connect the power cord.



Step 6 Hardware installation is completed. You can power on the system to start the related setup and application through LAN port or RS232 port. (Default account and password: admin / 1234, IP address: 192.168.0.1)

Complete! You may start the configurations of the system. Please refer to Chapter 4.

Contents

Chapter 1 RAID Introduction 10
1.1 What is RAID? 10
1.2 RAID Functions 10
1.3 RAID Levels and Comparisons 10
Chapter 2 iSCSI Introduction and Glossary 12
2.1 What is iSCSI? 12
2.2 Using iSCSI 12
2.3 Glossary 13
Chapter 3 Installation 14
3.1 Notice Before Installation 14
3.1.1 Sans Digital iSCSI Series Products Features 14
3.1.2 Verifying the related equipments 14
3.2 Management Methods 15
3.2.1 Web GUI (Graphic User Interface) 15
3.2.2 RS-232 Connection Port 18
3.2.3 Remote Control - Secure Shell 21
3.3 System Control 22
3.3.1 LCM (SL5650) 22
3.3.2 System Buzzer 23
Chapter 4 GUI Overview 24
4.1 GUI Architecture 24
4.2 Login 25
4.3 Quick install 26
4.4 System config 27
4.4.1 System name 27
4.4.2 IP address 28
4.4.3 iSCSI 28
4.4.4 Login Config 28
4.4.5 Password 29
4.4.6 Date 29
4.4.7 E-Mail 29
4.4.8 Simple Network Management Protocol (SNMP) 30
4.4.9 System log Server 30
4.4.10 Event log 30
4.5 iSCSI config 31
4.5.1 Entity property 31
4.5.2 NIC 31
4.5.3 Node 32
4.5.4 Session 32
4.5.5 CHAP account 32
4.6 Volume config 33
4.6.1 Physical disk 33
4.6.2 Volume group (VG) 35

4.6.3 User data volume (UDV) 35
4.6.4 Cache volume (CV) 36
4.6.5 Logical unit number 37
4.6.6 Example 37
4.7 Enclosure Management 45
4.7.1 SES config 45
4.7.2 Hardware Monitor 45
4.7.3 Hard Drive S.M.A.R.T. Function Support 46
4.7.4 UPS 46
4.8 Maintenance 47
4.8.1 Upgrade 47
4.8.2 Info 48
4.8.3 Reset to default 48
4.8.4 Congif import & export 48
4.8.5 Shutdown 48
4.9 Logout 49
Chapter 5 Advanced Operation 50
5.1 Rebuild 50
5.2 VG Migration and Expansion 51
5.3 UDV Expansion 52
5.4 Disk roaming 52
5.5 Support Microsoft MPIO and MC/S 52
Chapter 6 Application Description 53
6.1 Sharing Resources 53
6.2 Easy Storage Capacity Expansion 54
6.3 Remote Access 54
Appendix
A. Certification list 55
B. Event notifications 57
C. Using notices 60
D. Microsoft iSCSI Initiator 61
E. MPIO and MC/S configure instructions 66
F. QLogic QLA4010C configure instructions 82

Chapter 1 RAID Introduction

1.1 What is RAID?

It is inevitable that a single hard disk, either with SCSI or IDE interface, will suffer the compatibility problem between the motor rotational speed and the transfer interface. As a result, an Ultra160 SCSI or ATA100 IDE hard disk can only achieve the transfer rate of up to 30MB/Sec at the bandwidth of 100MHz.

In addition, the life span of a hard disk is limited. Once a hard disk is damaged, it is likely to lead to the system crash and data loss. Above mentioned are two severe problems in network system architecture. These factors have encouraged the creation of RAID (Redundant Arrays of Inexpensive / Independent Disks), a technology that combines multiple inexpensive and independent hard disks into an array of harddisks so as to increase data transfer performance and storage efficiency.

RAID implements the mechanisms such as Striping or Mirroring plus Parity Checking, to combine two or more physical hard disks into one virtual/logical disk array that allows On-line, quick access, huge capacity and fault tolerance. If one of the hard disks in the array is damaged, the system continues to operate using the remaining working hard disks, resulting in no system crash or data loss. In summary, RAID technology increases the performance and data security in network system architecture.

1.2 RAID Functions

- Expanding storage capacity
- Increasing data transfer speed
- Saving cost
- Inherent Fault Tolerance
- Hot Swap
- Auto-Rebuild
- Hot Spare
- On-line Capacity Expansion

1.3 RAID Levels and Comparisons

With the development of RAID technologies, users now have more options for RAID levels. Some vendors even have proprietary names for RAID levels. Generally, RAID levels include RAID 0, 1, 3, 5, 6, 0+1, 10, 30, 50, 60 and JBOD (Just a Bunch Of Disks).

The following is a comparison of some commonly used RAID levels.

RAID Level	Basic Operation Method	Hard Disk Available Capacity	Data Reliability	Data Transfer Speed	Minimum Number of Hard Disks
0	Striping data across each drive	Total capacity of all the hard disks	Low	Highest	2
1	Mirroring	Half of total capacity of all the hard disks	High	Lower	2
0+1	Mirroring data to another drive and stripping across the drive	Half of total capacity of all the hard disks	Very High	High	4

3	Stores parity information on independent disk	Total capacity of all the hard disks minus one disk capacity	High	Very High	3
5	Stores parity information on all the hard disks	Total capacity of all the hard disks minus one disk capacity	High	Very High	3
3+Spare	Stores parity information on independent hard disk & spare disk.	Total capacity of all the hard disks minus two disks capacity	Very High	High	4
5+Spare	Stores parity information on all the hard disks & spare disk.	Total capacity of all the hard disks minus two disks capacity	Very High	High	4
6	Stores parity information on all the hard disks	Total capacity of all the hard disks minus two disks capacity	Very High	High	4

For more information of RAID, refer to our website at www.sansdigital.com

Chapter 2 iSCSI Introduction and Glossary

2.1 What is iSCSI?

SCSI (Small Computer Standard Interface) is an ANSI standard parallel interface used by a computer to link up with peripheral devices. As it offers faster transfer rates than other standard interfaces, it is commonly used in workstations and servers as the interface of HDD and other storage devices.

A iSCSI (Internet SCSI) is a protocol that integrates SCSI protocol into TCP/IP packet in order to link storage device with servers over a network. iSCSI is capable of providing high-efficiency SANs (Storage Area Networks) over standard IP network such as LAN, WAN or Internet.

Conventional SANs generally refer to the storage area networks under Fiber-Channel. Yet to response to the effects of iSCSI, currently SANs are divided into FC-SANs and IP-SANs. IP-SAN uses iSCSI transfer protocol to add storage capacity unlimitedly to a server over the Internet, regarded as a real storage network system.

The storage capacity of IP-SANs can be expanded using various storage systems from various vendors. Furthermore, under SANs, any network types (such as Ethernet, High Ethernet or Fast Ethernet) and various operation systems (such as Microsoft Windows, Linux, Solaris and etc) can be supported. IP-SANs also provides the mechanisms for security, data duplication, multi-channel, high-efficiency and etc.

2.2 Using iSCSI

A connection using storage protocol such as iSCSI requires “two ends”, a “Initiator” and a “target”. In the iSCSI field, they are called “iSCSI initiator” and “iSCSI target”.

iSCSI initiator asks for operation from all SCSI, for example, read and write. iSCSI usually locates in the Host side or sever side.

On the other hand, iSCSI target refers to the storage equipments or the devices used for managing or allocating capacity. It is a device for executing SCSI commands. An iSCSI target can be a disk, tape or disk array.

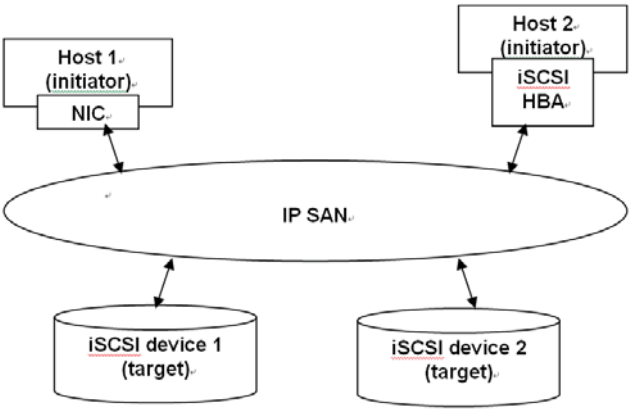


Figure 2.2.1

iSCSI initiator is essential to the host side. It is controlling SCSI in an iSCSI implementation. Its role can be played as either software or hardware (HBA). Please refer to the iSCSI HBA card list in Appendix A to confirm if your HBA card is supported. Initiator software adopts standard TCP/IP protocol and Ethernet facilities while iSCSI HBA card uses vendor-proprietary iSCSI and TCP/IP protocols.

iSCSI HBA card vendors will provide proprietary initiator tools. Please refer to your HBA card user manual for detailed information.

Users can download Microsoft iSCSI initiator software at the following URL:
http://www.microsoft.com/downloads/details.aspx?FamilyID=12cb3c1a-15d6-4585-b385-befd1319f825&DisplayLang=en

Please refer to Appendix D Microsoft iSCSI initiator for the installation instructions of Microsoft iSCSI initiator.

Linux OS provides iSCSI initiator as well. Refer to the URL below:
Instructions web page : http://linux-iscsi.sourceforge.net/
Download link : http://sourceforge.net/project/showfiles.php?group_id=26396
Instructions document : http://www.cuddletech.com/articles/iscsi/iscsiref.pdf

For Mac operation system, please refer to the URL below:http://www.attotech.com/xtend.html

For software used on other operation system, please refer to the related instructions on the respective websites.

2.3 Glossary

The following terms will be used throughout this manual:

RAID	Redundant Array of Independent Disks	DS	Dedicated Spare disks
PD	Physical Disk	GS	Global Spare disks
VG	Volume Group	DC	Dedicated Cache
UDV	User Data Volume	GC	Global Cache
CV	Cache Volume	DG	DeGrade mode
LUN	Logical Unit Number	S.M.A.R.T.	Self-Monitoring Analysis and Reporting Technology.
GUI	Graphic User Interface.	WWN	World Wide Name.
WT	Write-Through	HBA	Host Bus Adapter.
WB	Write-Back	MPIO	Multi-Path Input/Output.
RO	Read-Only	MC/S	Multiple Connections per Session
S.E.S	SCSI Enclosure Services	NIC	Network Interface Card
iSCSI	Internet Small Computer Systems Interface	LACP	Link Aggregation Control Protocol
MTU	Maximum Transmission Unit	CHAP	Challenge Handshake Authentication Protocol
iSNS	Internet Storage Name Service		

Chapter 3 Installation

3.1 Notice Before Installation

3.1.1 Sans Digital iSCSI Series Products Features

Sans Digital iSCSI Series Products are high-performance RAID system with the features as follows:

- Dual Gigabit channels design
- eSATA expansion interface
- Supports RAID 6 level
- Supports hot-swap
- N-way mirroring
- GUI operator interface
- Online capacity expansion and RAID level conversion
- Global/dedicated cache configuration by volume
- Supports S.M.A.R.T
- Supports SES
- Disk roaming
- MPIO ready (initiator driver or HBA card support needed)
- MC/S ready (initiator driver or HBA card support needed)
- Supports CHAP authentication

Sans Digital iSCSI Series products can be applied on different RAID level by connecting to a main system via iSCSI interface. Sans Digital iSCSI Series products provide reliable data security and supports RAID 6 level. RAID 6 level allows two damaged hard disks without affecting current data. Data in the damaged hard disk can be restored by the data in the working hard disks.

By providing high-performance and protecting your data, Sans Digital iSCSI Series Products are the most cost-effective and best solution in the network data storage backup field for small and medium business.

3.1.2 Verifying the related equipments

Before you install the related products, please verify the following items first:

- When you open the package and take out the hardware components, please check if any accessory is missing or damaged
- Refer to Appendix A Certification List to verify if your hardware devices are supported
- A server equips with Ethernet card or iSCSI HBA card
- CAT 5e or CAT 6 network cable used in the management and iSCSI port. We suggest you using CAT 6 network cable for optimal performance
- Plan your storage system architecture, such RAID and spare information, in advance
- The information on the management port and the iSCSI port. To use a static IP address, please prepare the information about the static IP address, subnet mask and default gateway
- High-speed network switch (recommended) or a high-speed network switch featuring VLAN/LCAP/ Trunking functions
- CHAP security information, including the CHAP user name and password (optional)

- Complete all the hardware installation before booting the system. The connection to the controller port, management port and iSCSI port should be completed first

3.2 Management Methods

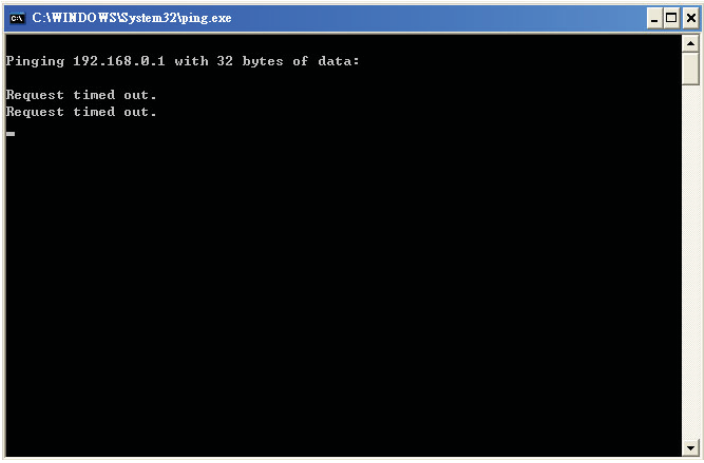
You can manage the Sans Digital iSCSI Series Products by one of the following three methods. Each method is described as follows:

3.2.1 Web GUI (Graphic User Interface)

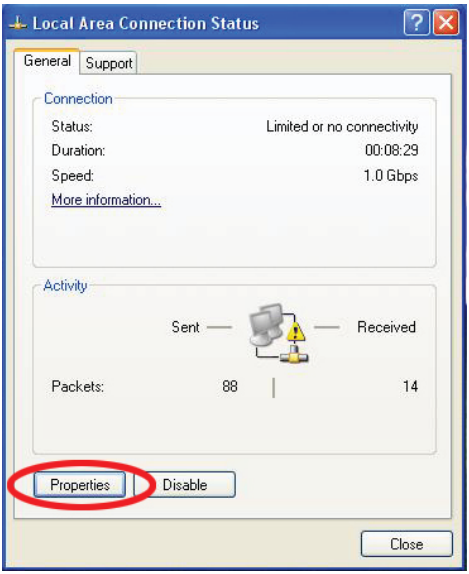
Sans Digital iSCSI Series Products support Graphic User Interface (GUI) for system management. Before getting started, make sure the related network port is connected. If you want to use a static IP address, make sure the IP address is not conflicting with other IP address. You can use the “ping” command to verify if IP address confliction occurs.

The default IP address of Sans Digital iSCSI Series Products is 192.168.0.1. The following instructions describe how to start your initial setup by configuring a static IP address in Windows XP system.

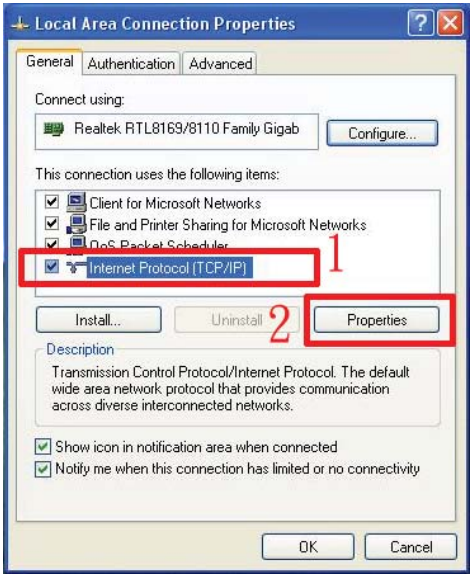
Step 1 First, verify if IP address confliction occurs. Click Start→Run→input ping xxx.xxx.xxx.xxx (the IP address you are going to use). If you get a reply of “Request time out.”, then you can use the IP address. It is recommended that you may also consult with your MIS personnel directly for the related IP address information.



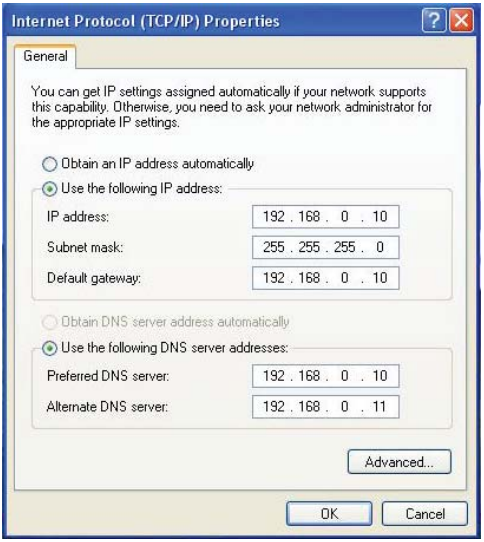
Step 2 Configure the domain. Click Start→Settings→Network Connections. A dialog window for your current network connection will appear. Select “Network Connections” and then click “Properties”.



Step 3 Select “Internet Protocol (TCP/IP)” and click “Properties”. A dialog window for IP address settings will appear.



Step 4 Configure the IP address, subnet mask, gateway and DNS. You can consult with the MIS personnel in your company for the related IP address.


Internet Protocol (TCP/IP) Properties
General
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address: 192 . 168 . 0 . 10
Subnet mask: 255 . 255 . 255 . 0
Default gateway: 192 . 168 . 0 . 10
Obtain DNS server address automatically
Use the following DNS server addresses:
Preferred DNS server: 192 . 168 . 0 . 10
Alternate DNS server: 192 . 168 . 0 . 11
Advanced...
OK
Cancel

Step 5 After the configuration, click “OK” to complete the settings. (If you need to change the IP address in the future, you should make sure that the IP addresses used by Sans Digital iSCSI Series Products are in the same domain to ensure the proper system operation.)

Step 6 Login the system. The default IP address of Sans Digital iSCSI Series Products is 192.168.0.1. Open your web browser and input:

http://192.168.0.1

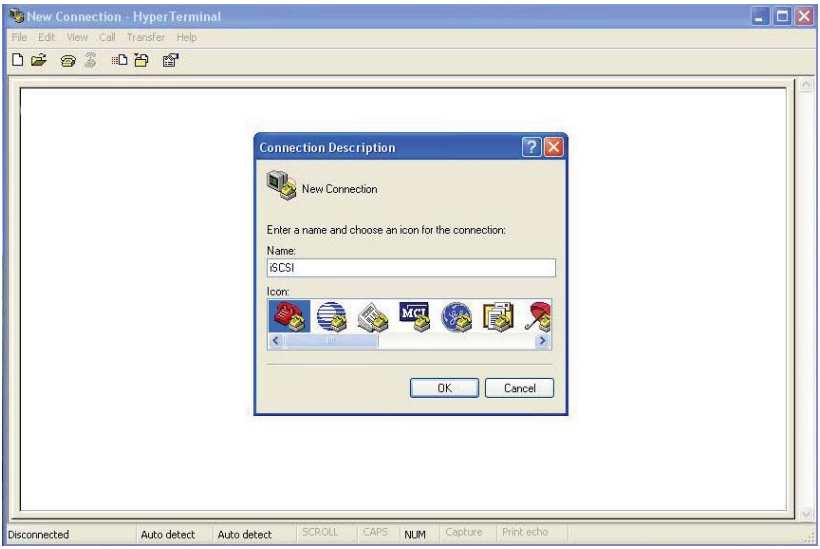
To use the system for the first time, click any of the functions to pop up the screen requesting for account and password. The default username and password are as follows:
Login Username: admin ; Default Password: 1234

3.2.2 RS-232 Connection Port

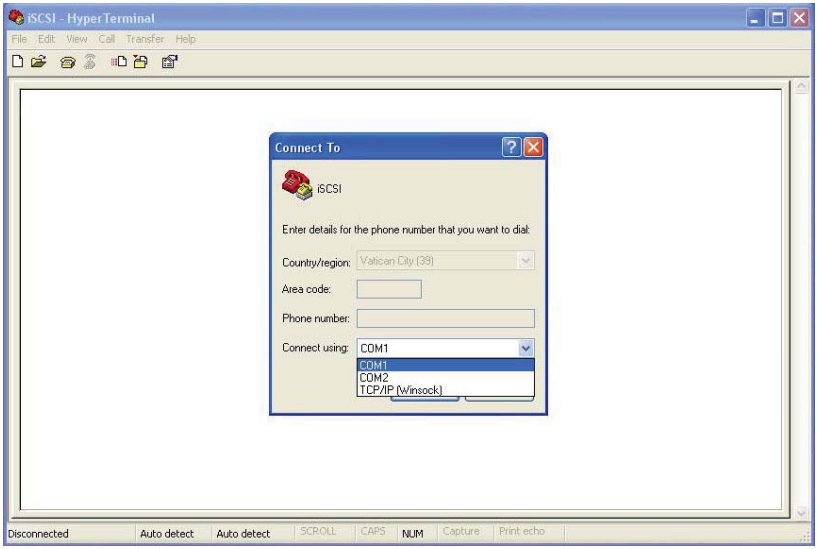
The system can also be managed and configured via the RS-232. In case you have forgotten the IP address you have configured, you can then use RS-232 port to enter the system for configure. The following instructions are based on Windows XP environment.

Step 1 Please make connection by using RS-232 cable provided in the Accessory Kit. Once the connection is completed, switch the power on.

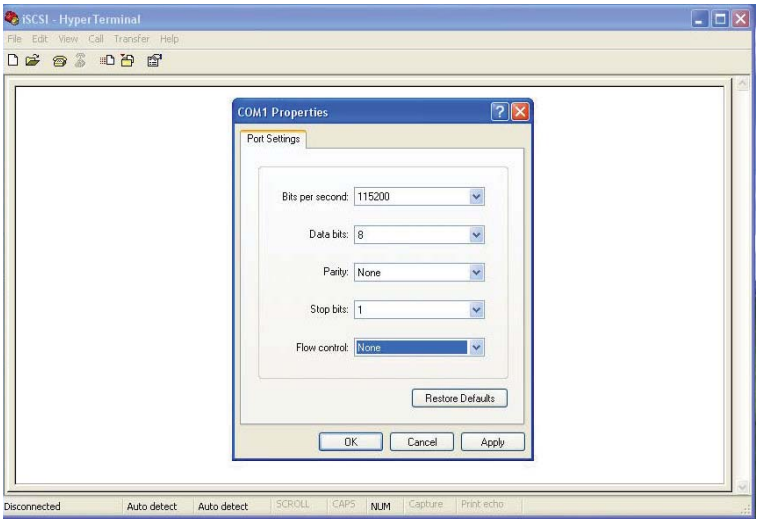
Step 2 Click Start→Programs→Accessories→Communications→HyperTerminal. To configure the terminal settings. The first step is to give a name for this terminal setting.



Step 3 Select the connection port.

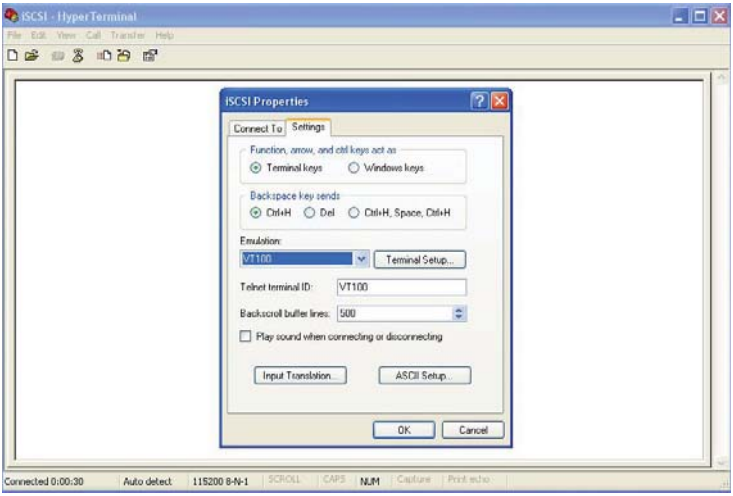


Step 4 Configure the related settings.



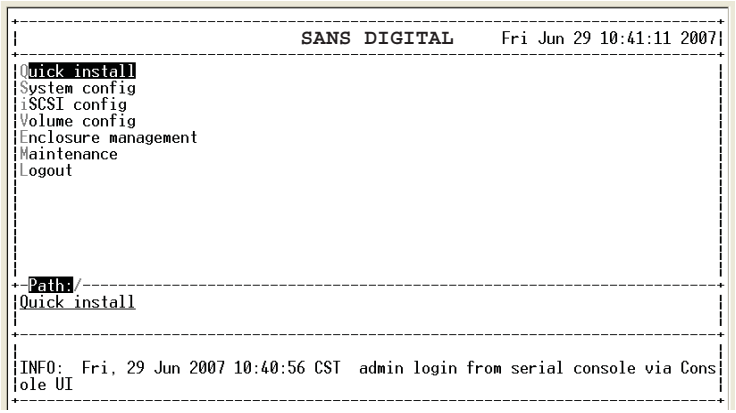
Bits per second: 115200
Data bits: 8 bite
Parity: None
Stop bits: 1
Flow control: None

Step 5 Select the terminal type. Please click File→Properties→Settings. Specify the terminal type as vt100. Then click “OK” to complete the connection.



Step 6 After the connection, input the username and password and then login. The following operations

are similar to the operations via web-based GUI. Please refer to Chapter 4 for instructions.

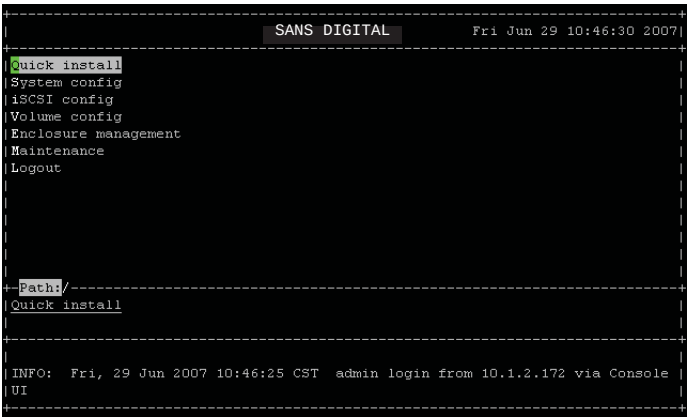


Login Username: admin
Default Password: 1234

3.2.3 Remote Control - Secure Shell

SSH (secure shell) allows remote login to Sans Digital iSCSI Series Products
You can download SSH end user software via the following websites:
SSHWinClient WWW : http://www.ssh.com/
Putty WWW : http://www.chiark.greenend.org.uk/

Host name: 192.168.0.1
Login Username: admin
Default Password: 1234



Remind : Sans Digital iSCSI Series Products support SSH for remote control. To use SSH functions, IP address and password are required for login.

3.3 System Control

3.3.1 LCM (SL5650)

Use the four function keys, ▲(Up), ▼(Down), ESC (Escape) and ENT (Enter) to control LCM (LCD Control Module). After booting up the system, the following screen will be displayed.

After pressing ENT (Enter) key, you can use ▲(Up) and ▼ (Down) keys to select a LCM function.

If there is any alarm or error message, LCM will show the related information on the screen to provide users with more information.

Each LCM function is described as follows:

Alarm Mute	To turn off the alarm sound when an error occurs
Reset/Shutdown	To reset or shutdown the controller
Quick Install	To use “Quick Install” to set up a volume by three steps. Please refer to section 4.3 for configure via the web-based GUI
View IP Setting	To view current IP address, subnet mask and gateway
Change IP Config	To set up the IP address, subnet mask and gateway. You can choose to use DHCP server (for IP address allocation) or manually specify the IP address
Reset to Default	To restore factory defaults: Default Password: 1234 Default IP address: 192.168.0.1 Default subnet mask: 255.255.255.0 Default gateway: 192.168.0.254

LCM architecture reference diagram

Sans Digital IntelliRAID ▲▼	[Alarm Mute]	[▲Yes No▼]		
	[Reset/Shutdown]	[Reset]	[▲Yes No▼]	
		[Shutdown]	[▲Yes No▼]	
	[Quick Install]	RAID 0 (RAID 1/RAID 3/ RAID 5/RAID 6) xxxxxx MB	Volume Size (xxxxxx MB)	Adjust Volume Size
			Apply The Config	[▲Yes No▼]
	[View IP Setting]	[IP Config] [Static IP]		
		[IP Address] [192.168.000.001]		
		[IP Subnet Mask] [255.255.255.0]		
		[IP Gateway] [192.168.000.254]		
	[Change IP Config]	[DHCP]	[▲Yes No▼]	
		[Static IP]	[IP Address]	Adjust IP address
			[IP Subnet Mask]	Adjust Submask IP
			[IP Gateway]	Adjust Gateway IP
			[Apply IP Setting]	[▲Yes No▼]
	[Reset to Default]	[▲Yes No▼]		

Note : Before powering off, please execute “Shutdown” to flush the data from the cache

3.3.2 System Buzzer

The system buzzer features are described as follows:

1. The system buzzer alarms to confirm that system boots up successfully
2. The system buzzer alarms continuously when system failure or error occurs. The alarm can be stopped via the mute option (Alarm Mute)

Chapter 4GUI Overview

4.1 GUI Architecture

The following is the GUI architecture:

Quick Install	→	Step 1 / Step 2 / Step 3 / Confirm
System Config		
System name	→	System name
IP address	→	DHCP / Static / HTTP port / HTTPS port / SSH port
iSCSI	→	iSNS / Authentication / Link aggregation or Multi-homed / IP settings / Default gateway / Set MTU
Language	→	Auto Detect / English / Simple Chinese
Log config	→	Auto Logout / Login Lock
Password	→	Old password / Password / Confirm
Date	→	Date / Time / Time zone / Daylight saving / NTP / Server
Mail	→	Mail-from address / Mail-to address / SMTP relay / Authentication / Send test mail
SNMP	→	SNMP trap address / Community
System log server	→	Server IP / Hostname / Port / Facility / Event Level
Event log	→	Filter / Mute / Clear / Download
iSCSI Config		
Entity Property	→	Entity name / iSNS IP
NIC	→	Name / DHCP / IP Address Netmask / Gateway / MTU / MAC Address / Link / Entity Name
Node	→	Name / Auth
Session	→	Initiator Name / TPGT / Error Recovery Level / Error Recovery Count
CHAP account	→	User
Volume config		
Physical disk	→	Free disc / Global spares / Dedicated spares / More information
Volume group	→	Create / Delete / More information / Rename / Migrate
User data volume	→	Create / Delete / Attach LUN / More information / Rename / Extend / Set read/write mode / Set priority
Cache volume	→	Create / Delete / More information / Resize
Logical unit	→	Attach / Detach
Enclosure management		
SES Config	→	Enable / Disable
Hardware Monitor	→	Item / Information / Confirm
S.M.A.R.T.	→	S.M.A.R.T. for physical disks
UPS	→	UPS Type / Shutdown Battery Level / Shutdown Delay / Shutdown UPS
Maintenance		
Upgrade	→	Browse the firmware to upgrade
Info	→	System information
Reset to default	→	Reset to factory default
Config Import & Export	→	Import / Export / Import File
Shutdown	→	Reboot / Shutdown
Logout		

4.2 Login

Sans Digital iSCSI Series Products supports graphic user interface (GUI) to manage the system. Make sure the network cable is already connected and configured to the same domain as your current related devices. Please refer to 3.2.1 for related configures. The following descriptions are examples based on the default IP address: 192.168.0.1. Please open your web browser and input:
http://192.168.0.1

To use the system for the first time, click any of the functions to pop up the dialog window requesting for account and password. The default account and password are as follows:

Login account: admin
Default Password: 1234

After login, you can choose a function from the list to the left side of the window for related configures.

There are four indicators at the top-right corner of the window. Each indicates:

1. RAID light : Green indicates RAID is working properly. Red indicates RAID error.
2. Temperature light: Green indicates normal. Red indicates abnormal system temperature.
3. Voltage light : Green indicates normal. Red indicates abnormal voltage status. Please refer to 4.6.2 for more details.
4. UPS : Green indicates normal. Red indicates abnormal UPS status.

4.3 Quick install

You can use “Quick install” function for quick configure. On RAID levels 0, 1, 3, 5 and 6, the system will automatically calculate the maximum available capacity, which is subject to the number of your hard disks and currently available capacity.

Step 1 Select “Quick install”, the system will ask you to configure the RAID level, as shown in to figure 4.3.1. After configuring the RAID level, click “ Next >> ” to enter next page to configure “LUN”.

Figure 4.3.1

Step 2 Please select a Logical Unit Number (LUN). The wildcard “*” indicates that every host is allowed to access this capacity. You can change the volume size in this page. The maximum volume size will be automatically shown on this page. Input a value specified a size less than or equal to the maximum volume size, and click “ Next >> ”.

Step 3 Confirmation page. The system will display all the related information as shown in Figure 4.3.2. If the information is correct, click “ Confirm ”.

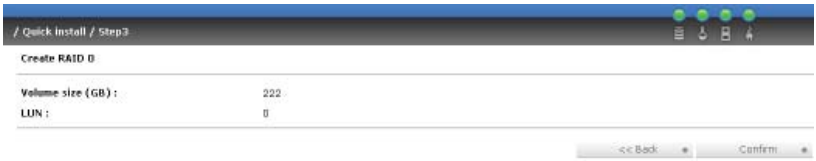


Figure 4.3.2

4.4 System config

“System config” function allows you to configure the basic functions of the system.

System name	System name for identification
IP address	Internet Protocol(IP) address for remote administration
Language	Language preference for WebUI
Login config	Configuration for auto logout and login lock
Password	Administrator's password
Date	System time for event log
Mail	Alert by e-mail
SNMP	Alert via Simple Network Management Protocol(SNMP)
System log server	Alert to remote system log server
Event log	System event log to record critical events

Figure 4.4

4.4.1 System name

Select “System name” to change system name. The default System name is in accordance with the product name and serial number of the system. For example: SANSDIGITAL-000001.

Figure 4.4.1

4.4.2 IP address

Select “IP address” to change the IP address for remote control page. You can choose DHCP (to obtain IP address from DHCP server) or static IP to change the HTTP, HTTPS and SSH ports.

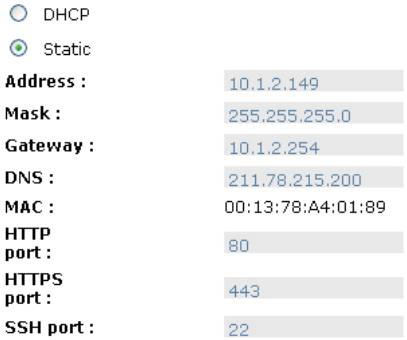


Figure 4.4.2

4.4.3 Language

Select “Language” to setup the GUI language.

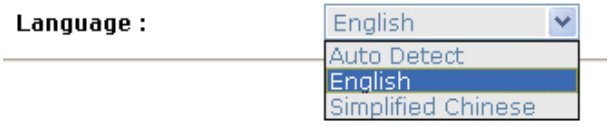


Figure 4.4.3

4.4.4 Login Config

Select “Login config” to configure the time of single login and auto logout. Single login can prevent multiple users from simultaneously accessing the management console.

1. Auto logout: The options include (1) Disable (2) 5 min (3) 30 min (4) 1 hour. If a user idles after the specified time elapsed, the system will automatically logout to allow other users to login.

Figure 4.4.4

2. Login block: Disable / Enable. When login block is enabled, only one user is allowed to login/change the system settings.

4.4.5 Password

Click “Password” to change the administrator password. Input the original password first and then input your new password two twice.

Figure 4.4.5

4.4.6 Date

Click “Date” to configure current date and time.(We recommend you configure it before using the system to ensure the time consistency across the network.)

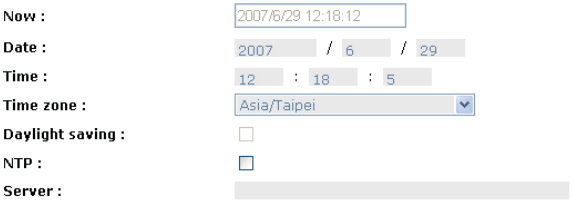


Figure 4.4.6

4.4.7 E-Mail

Click “Mail” to input up to 3 E-mail addresses for receiving the event notification. Mail servers will check “Mail-from address” and block spam mails. Please fill the necessary fields and select “Send test mail” to verify the E-mail notification function works properly.

Figure 4.4.7

4.4.8 Simple Network Management Protocol (SNMP)

Select “SNMP” to configure SNMP (Simple Network Management Protocol) trap messages. It allows up to 3 SNMP trap message addresses. The default community configure is “public”.

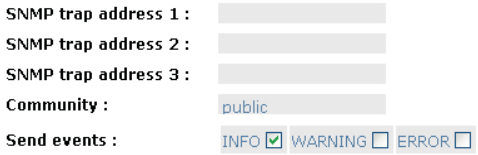


Figure 4.4.8

4.4.9 System log Server

The System log server supports remote access to the disk array system’s log. It allows system event log to be recorded into files and be sent to those operating systems with the “syslogd” applications.

If this functionality is required, the ER104I/MR4I set as the “Target”. Please follow the screen below and fill out the information necessary with 514 TCP port set as the communication port.

Currently, both Windows & MAC do not support system log server functions, if you require this function, please contact Windows or MAC support for further details or updates. A third party program support syslogd may be available.

Figure 4.4.9

4.4.10 Event log

Event log contain system event of the unit. Click “Event log” to view the event messages. Click “Filter” to select the log type to be displayed. Click “Download” button to save the whole event log as a text file “log-xxxx.txt”. Click “Clear” button to clear the whole event log. Click “Mute” button to stop system alerts.

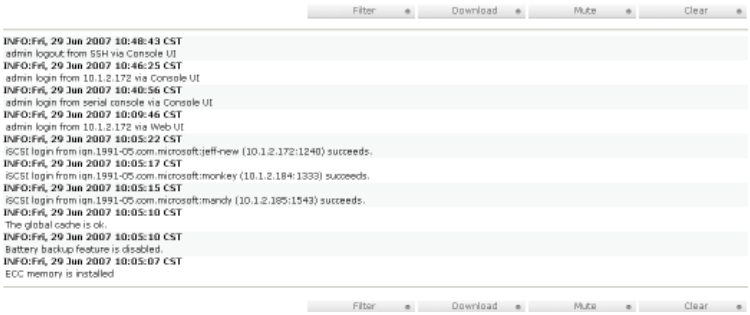

Filter
Download
Mute
Clear
INFO:Fri, 29 Jun 2007 10:48:43 CST
admin logout from SSH via Console UI
INFO:Fri, 29 Jun 2007 10:46:25 CST
admin login from 10.1.2.172 via Console UI
INFO:Fri, 29 Jun 2007 10:40:56 CST
admin login from serial console via Console UI
INFO:Fri, 29 Jun 2007 10:09:46 CST
admin login from 10.1.2.172 via Web UI
INFO:Fri, 29 Jun 2007 10:05:22 CST
iSCSI login from iqn.1991-05.com.microsoft:jeff-new (10.1.2.172:1240) succeeds.
INFO:Fri, 29 Jun 2007 10:05:17 CST
iSCSI login from iqn.1991-05.com.microsoft:monkey (10.1.2.184:1333) succeeds.
INFO:Fri, 29 Jun 2007 10:05:15 CST
iSCSI login from iqn.1991-05.com.microsoft:mandy (10.1.2.185:1543) succeeds.
INFO:Fri, 29 Jun 2007 10:05:10 CST
The global cache is ok.
INFO:Fri, 29 Jun 2007 10:05:10 CST
Battery backup feature is disabled.
INFO:Fri, 29 Jun 2007 10:05:07 CST
ECC memory is installed
Filter
Download
Mute
Clear

Figure 4.4.10.1

There are three methods to display the event log: “Show events” in the event log page, “Pop up events” in the pop-up window in the web page, and “Show on LCM” (SL5650). You can select a preferred one.

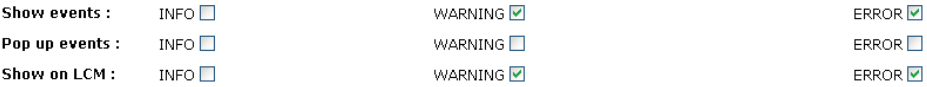


Figure 4.4.10.2

4.5 iSCSI config

Select the “iSCSI config” allows you to configure the related iSCSI settings.

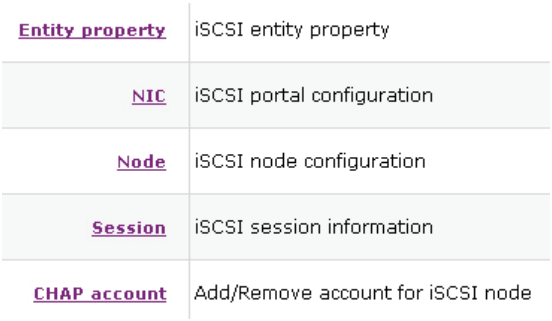


Figure 4.5

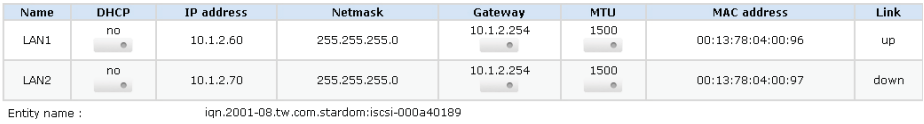
4.5.1 Entity property

Once the Entity name has been displayed, you may input the iSNS IP address. Through the iSNS function, the iSCSI storage system is able to pass the related management information to the iSNS server to provide better management of overall iSCSI network.

Figure 4.5.1

4.5.2 NIC

This function allows the two communication ports for two IP addresses. Select DHCP no to configure the usage of the DHCP or the static IP address. Select Gateway 10.1.2.254 to configure the default gateway IP address. Select MTU 1500 to configure the MTU value. Static IP address is highly recommended.



Name	DHCP	IP address	Netmask	Gateway	MTU	MAC address	Link
LAN1	no	10.1.2.60	255.255.255.0	10.1.2.254	1500	00:13:78:04:00:96	up
LAN2	no	10.1.2.70	255.255.255.0	10.1.2.254	1500	00:13:78:04:00:97	down

Entity name : iqn.2001-08.tw.com.stardom:iscsi-000a40189

Figure 4.5.2

4.5.3 Node

Displays Node name. Select Auth CHAP to enable or disable the CHAP function.

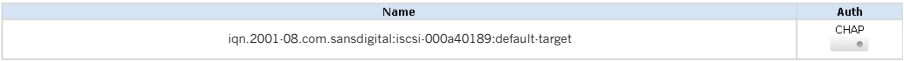


Figure 4.5.3

4.5.4 Session

Displays the number of users connected to the system. Select No to see the related information such as “Initiator IP”, ”Initiator name” and ”Authentication”.

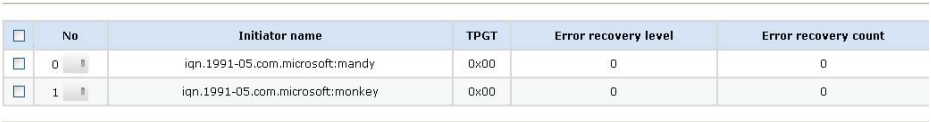


Figure 4.5.4.1

Figure 4.5.4.2

4.5.5 CHAP account

Sets up related information of CHAP. Select Create to add a new CHAP user. Select Delete to delete an existing user. Select User sansdigital to further set up related configuration of each user.

Figure 4.5.5

4.6 Volume config

“Volume config” allows you to configure any volume related functionalities of the system.

Physical disk	Hard disks to store data
Volume group	Sets of physical disks with RAID functions
User data volume	Slices of volume groups
Cache volume	Dedicated or global cache space for user data volume
Logical unit	Target volumes for hosts access

Figure 4.6

4.6.1 Physical disk

Enter the “Physical disk” option to view the status of hard disks installed in the system.
The following are operation tips:

1. Multiple selections. Select one or more hard disks by clicking the checkboxes. Or click the checkbox at the top left corner for the system to select all the disks automatically. Ticking again will select none.
2. The list will not appear if there is no Volume Group (VG) or VG under RAID 0 or JBOD mode. This is because the dedicated disk cannot be configured under these RAID levels.
3. Three functions, “ Free disks ”, “ Global spares ” and “ Dedicated spares ”, are allow multiple selection.

Slot	WWN	Size (GB)	VG name	Status	1	2	Speed
1	203a001378a40189	74	QUICK18724	Good	RD		3.0Gb
2	203b001378a40189	74	QUICK18724	Good	RD		3.0Gb
3	203c001378a40189	698	QUICK18724	Good	RD		3.0Gb
4	2009001378a40225	465	QUICK18724	Good	RD		3.0Gb

Auto spindown : Disabled

Figure 4.6.1

• Physical disk field description:

Slot	The slot number of the hard disk. The blue button next to the number indicates “More Information” function. Clicking it shows the details of the hard disk.
WWN	World Wide Name.
Size (MB)	Disk volume
VG Name	Associated Volume Group name.
Status	Disk state: “GOOD” → The hard disk is good. “DEFECT” → The hard disk has errors. “FAIL” → The disk fails to function properly.
Status 1	“RD” → RAID Disk. This hard disk has been configured with a RAID level. “FR” → Free disk. This hard disk is free for use. “DS” → Dedicated Spare. This disk has been configured to be the dedicated spare of the VG. “GS” → Global Spare. This disk has been configured to be a global spare of all VGs. “RS” → Reserve. The disk contains the VG information but cannot be used. It is caused by incomplete VG configure, or hot-plug of the hard disk during system operation. In order to protect the data in the hard disk, the status is changed to reserve automatically. It can be reused after configuring it to “FR” manually.
Status 2	“R” → Rebuild. The hard disk is under rebuilding “M”→ Migration. The disk is under data migration
Speed	3.0G → The hard disk speed can reach the SATA2 level (3.0Gbps) 1.5G → The hard disk speed can reach the SATA1 level (1.5Gbps) Unknown → The hard disk does not support either of above levels

• Physical disk operations description:

FREE DISC	Configure the selected hard disk(s) to be free for use
GLOBAL SPARES	Configure the selected hard disk(s) to be the global spare of all VGs
DEDICATED SPARES	Configure the selected hard disk(s) to be dedicated spare of selected VGs

4.6.2 Volume group (VG)

Click “Volume group” to view the status of each volume group.

- VG field description:

Figure 4.6..2

No.	Volume group number. The blue button next to the number indicates “More Information” function. Clicking it shows the details of the volume group.
Name	Volume group name. The blue button next to the name indicates “Rename” function.
Total(MB)	Total capacity of this volume group
Free(MB)	Free capacity of this volume group
#PD	The number of physical disks of the volume group
#UDV	The number of user data volumes of the volume group
Status	The status of volume group “Online” → Volume group is online “Fail” → Volume group fails
Status 1	“DG” → Degraded mode. This volume group is not degraded. The reason could be hard disk failure or failured hard disk have not been replace.
Status 2	“R” → Rebuild. This volume group is under rebuilding.
Status 3	“M” → Migration. This volume group is under migration.
RAID	The RAID level of the volume group. The blue button next to the RAID level indicates “Migrate” function. Clicking “Migrate” allows adding disk(s) for expansion or changing the RAID level of the volume group.

- VG operation description:

CREATE	Create a volume group
DELETE	Delete a volume group

4.6.3 User data volume (UDV)

Enter the “User data volume” function to view the status of each user data volume

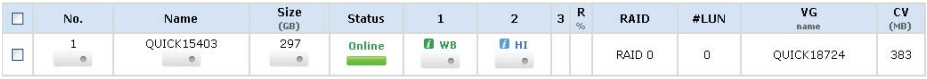


Figure 4.6.3

- UDV field description:

No.	Number of this user data volume. The blue button below the UDV number indicates “More Information” function. It shows the details of the user data volume.
Name	Name of this user data volume. The blue button below the UDV Name indicates “Rename” function.

Size(MB)	Total capacity of this user data volume. The blue button below the size indicates “Extend” function.
Status	The status of this user data volume: “Online” → User data volume is online. “Fail” → User data volume fails.
Status 1	“WT” → Write Through. “WB” → Write Back. The blue button below the status 1 indicates “Set read/write mode” function
Status 2	“HI” → High priority. “MD” → Medium priority. “LO” → Low priority. The blue button below the status 2 indicates “Set Priority” function
Status 3	“I” → User data volume is initializing “R” → User data volume is under rebuilding “M” → User data volume is under migration
R %	% complete of initializing or rebuilding
RAID	The RAID level that user data volume is currently using
#LUN	Number of LUN(s) that data volume is attaching
VG name	The VG name of the user data volume
CV (MB)	The cache volume of the user data volume

・UDV operation description:

ATTACH LUN	Attach to a LUN
CREATE	Create a user data volume
DELETE	Delete a user data volume

4.6.4 Cache volume (CV)

Enter “Cache volume” function to view the status of cache volume

The global cache volume is a default cache volume, which is automatically created after power on, and cannot be deleted. The size of global cache is based on the RAM size. It is total memory volume minus the system usage.

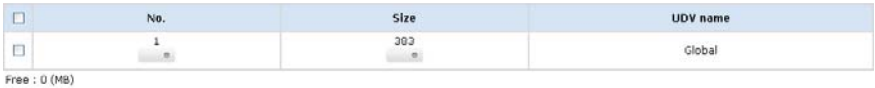


Figure 4.6.4

・CV field description:

No.	Number of the cache volume. The blue button next to the CV number indicates “More Information” function. It shows the details of the cache volume.
Size(MB)	Total capacity of the cache volume. The blue button next to the CV size indicates “Resize” function. The cache volume size can be adjusted through the above function.
UDV Name	Name of UDV

・CV operations description:

CREATE	Create a cache volume
DELETE	Delete a cache volume

4.6.5 Logical unit number

Enter “Logical unit” function to view the status of attached logical unit number of each UDV

You can add LUN by clicking the “ Attach ”. The configuration screen will show, as in Figure 4.6.5.1 You must input an initiator name in the “Host” field for access control, or fill-in wildcard “*”, which allow every host can control the volume. Choose LUN and permission, click “ Confirm ” as shown in Figure 4.6.5.2.

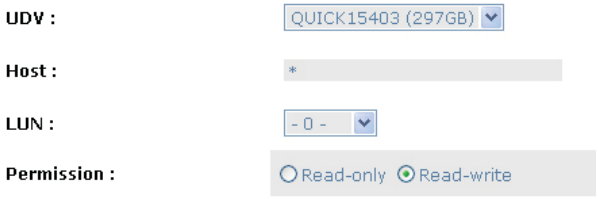


Figure 4.6.5.1

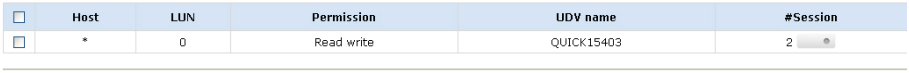


Figure 4.6.5.2

- LUN operations description:

ATTACH	Attach a logical unit number to a user data volume
DETACH	Detach a logical unit number from a user data volume

The authorization rules of access control are applied in top-down order. For example: there are two rules for the same UDV, one is “*” for LUN 0 and the other is “iqn.host1” for LUN 1. A different host “iqn.host2” is allowed to login to have access control because the rule one allow access for all host.

The access will be denied when there is no matching rule.

4.6.6 Example

The followings are examples for creating a volume. Example 1 is to create two UDVs sharing the same CV (global cache volume) and configure a global spare disk. Example 2 is to create two UDVs. One shares global cache volume while the other uses dedicated cache volume. A dedicated spare disk will be configured.

- Example 1
  Example 1 is to create two UDVs in one VG, each UDV shares global cache volume. Global cache volume is automatically created after system boots up, therefore no action is needed to configure CV. Finally, set a global spare disk. The last protion will show how to delete all configurations.

Step 1 Create VG (Volume Group).

To create the VG, please follow the steps below.

Figure 4.6.6.1

1. Select “/Volume config /Volume group”
2. Click “ Create ”
3. Input a VG Name. Choose a RAID level from the list. Click “ Select PD ” to choose the the physical disk in the RAID, click “ Next >> ”. Since we will create a spare disk, do not select all disk and leave one physical disk for spare disk creation.
4. Confirm the results. Click “ Confirm ” if all the settings are correct
5. A VG will be created after the confirmation.

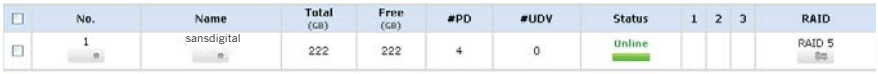


Figure 4.6.6.2

Step 2 Create UDV (User Data Volume).

To create a UDV, please follow the steps below.

Figure 4.6.6.3

1. Select “/Volume config/User data volume”
2. Click “ Create ”
3. Input a UDV name. Choose a VG Name and input a size for the UDV. Decide the stripe height, block size, read/write mode and configure the priority, and click “ Confirm ”. Since we will create 2 UDV, do not use all sizes avaliable.
4. A UDV will be created after the confirmation.
5. Repeat the steps above to create the second UDV. Create the UDV with rest of the sizes.

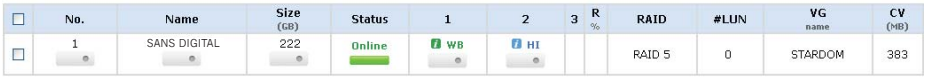


Figure 4.6.6.4

Step 3 Attach LUN to UDV.

There are two methods to attach LUN to UDV.

1. In “/Volume config/User data volume”, click “ Attach ”
2. In “/Volume config/Logical unit”, click “ Attach ”.

To attach a LUN to UDV:

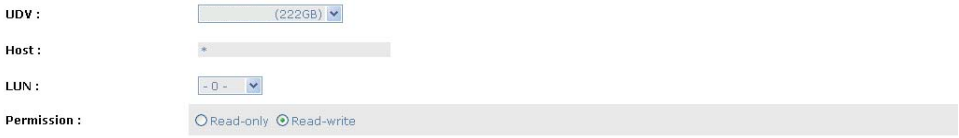


Figure 4.6.6.5

1. Select a UDV
2. Input “Host” which is the initiator name for access control of this volume or input the wildcard “*” to grant access to every host. Configure LUN and permission, then click “ Confirm ”.

	Host	LUN	Permission	UDV name	#Session
☐	*	0	Read write	SANS DIGITAL	2

Figure 4.6.6.6

Note : The authorization rules of access control are applied in top-down order. Please refer to 4.6.5 for details.

Step 4 Configure global spare disk.

To configure global spare disks:

1. Select “/Volume config/Physical disk”
2. Select the free disk(s) by clicking the checkbox. Click “ Global spares ” to configure them as global spares
3. There will be a “GS” icon at status 1 field

Example 1, create 2 UDV with spare disk is completed. You can now connect to the iSCSI volume to iSCSI initialor.

To delete UDVs and VG, please follow the steps below

Step 1: Detach LUN from UDV

Enter “/Volume config/Logical unit”.

	Host	LUN	Permission	UDV name	#Session
☐	*	0	Read write	SANS DIGITAL	2

Figure 4.6.6.7

1. Select LUNs by ticking the checkbox and then click “ Detach ”. A confirmation window will pop up.
2. Click “OK”

Step 2 Delete UDV (User Data Volume)

To delete the UDV:

1. Select “/Volume config/User data volume”
2. Select UDVs by ticking the checkbox.
3. Click “ Delete ” and a confirmation window will pop up
4. Select “OK”
5. OK. A UDV has been deleted

Remind : When a UDV is deleted, the attached LUN(s) related to this UDV will also be detached automatically.

Step 3 Delete VG (Volume Group)

To delete the VG, please follow the steps below.

1. Select “/Volume config/Volume group”
2. Select a VG by clicking the checkbox. Make sure that there is no UDV on this VG and the UDV(s) on this VG have been deleted.
3. Click “ Delete ” and a confirmation window will pop up.
4. Click “OK” to confirm

Remind : The action of deleting the VG will be complete only when all of the related UDV(s) have been deleted in this VG. Otherwise, error will occur when deleting VG.

Step 4 Free global spare disk.

To free global spare disks, please follow the steps below.

1. Select “/Volume config/Physical disk”
2. Select the global spare disk by ticking the checkbox, then click “ Free disks ” to free the disk(s).

・Example 2

Example 2 will create two UDVs in one VG. One UDV shares global cache volume while the other uses dedicated cache volume. First, a dedicated cache volume should be created; it will be useful in creating UDV. The last protion will show how to delete all configurations.

Each UDV is associated with one specific CV (cache volume) to execute the data transmission. Each CV could have different cache memory size. If there is no special request in UDVs, it will use global cache volume. User can create a dedicated cache for individual UDV manually. Using dedicated cache volume, the performance would not be affected by the data access of other UDVs that using global CV.

The total cache size depends on the RAM size and all the size will be configured as global spare cache automatically. To create a dedicated cache volume, the first step is to cut down the global spare cache size for the dedicated cache volume.

Step 1 Create dedicated cache volume

Figure 4.6.6.8

1. Select “/Volume config/Cache volume”.
2. If there is no enough space for creating a new dedicated cache volume, cut down the global spare cache size first by clicking the blue button “ Size 383 ” in the size field. After re-allocation of the volume size, click “ Confirm ” to return to cache volume page
3. Click “ Create ” to enter the configure page
4. Fill in the size and click “ Confirm ”

Remind : The minimum size of global cache volume is 40MB. The minimum size of dedicated cache volume is 20MB.

Step 2 Create VG (Volume Group)

To create the VG, please follow the steps below.

1. Select “/Volume config /Volume group”
2. Click “ Create ”
3. Input a VG Name. Choose a RAID level from the list. Click “ Select PD ” to choose the the physical disk in the RAID, click “ Next >> ”. Since we will create a spare disk, do not select all disk and leave one physical disk for spare disk creation.
4. Confirm the results. Click “ Confirm ” if all the settings are correct
5. A VG will be created after the confirmation.

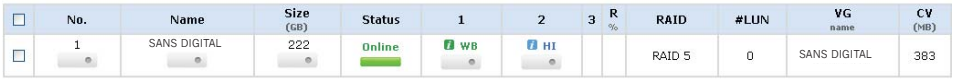
Step 3 Create UDV (User Data Volume)

To create a UDV, please follow the steps below.

1. Select “/Volume config/User data volume”
2. Click “ Create ”
3. Input a UDV name. Choose a VG Name and input a size for the UDV. Decide the stripe height, block size, read/write mode and configure the priority, and click “ Confirm ”. Since we will create 2 UDV, do not use all sizes avaliable.
4. A UDV will be created after the confirmation.

To create a UDV with dedicated cache volume, please follow the steps below.

1. Select “/Volume config/User data volume”
2. Click “ Create ”
3. Input a UDV name. Choose a VG Name, and select the dedicated cache which is created earlier. Input the size for the UDV, and decide the stripe height, block size, read/write mode and set priority. Finally, click “ Confirm ” to confirm the creation.



No.	Name	Size (GB)	Status	1	2	3	R %	RAID	#LUN	VG name	CV (MB)
1	SANS DIGITAL	222	Online	WB	HI			RAID 5	0	SANS DIGITAL	383

Figure 4.6.6.9

No.	Size	UDV name
1	200	Global
2	183	SANS DIGITAL

Free : 0 (MB)

Figure 4.6.6.10

Step 4 Attach LUN to UDV

There are two methods to attach LUN to UDV.
1. In “/Volume config/User data volume”, click “ Attach ”
2. In “/Volume config/Logical unit”, click “ Attach ”.

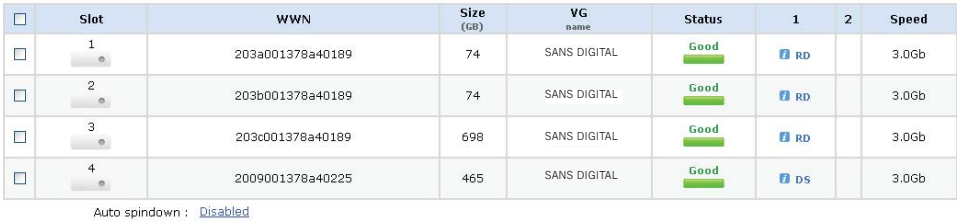
To attach a LUN to UDV:

1. Select a UDV
2. Input “Host” which is the initiator name for access control of this volume or input the wildcard “*” to grant access to every host. Configure LUN and permission, then click “ Confirm ”.

Step 5 Configure dedicated spare disk

To configure dedicated spare disks, please follow the steps below:

1. Select “/Volume config/Physical disk”
2. Select a VG from the list, then select the disk(s) to be freed and click “ Dedicated spares ” to set them as dedicated spare for the selected VG.
3. There will be a “DS” icon at status 1 field



Slot	WWN	Size (GB)	VG name	Status	1	2	Speed
1	203a001378a40189	74	SANS DIGITAL	Good	RD		3.0Gb
2	203b001378a40189	74	SANS DIGITAL	Good	RD		3.0Gb
3	203c001378a40189	698	SANS DIGITAL	Good	RD		3.0Gb
4	2009001378a40225	465	SANS DIGITAL	Good	DS		3.0Gb

Auto spindown : Disabled

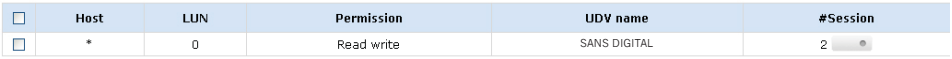
Figure 4.6.6.11

Example 2, create 2 UDV with dedicate spare disk is completed. You can now connect to the iSCSI volume to iSCSI initialor.

To delete UDVs and VG, please follow the steps below

Step 1: Detach LUN from UDV

Enter “/Volume config/Logical unit”.



Host	LUN	Permission	UDV name	#Session
*	0	Read write	SANS DIGITAL	2

Figure 4.6.6.12

1. Select LUNs by ticking the checkbox and then click “ Detach ”. A confirmation window will pop up.
2. Click “OK”

Step 2 Delete UDV (User Data Volume)

To delete the UDV:

1. Select “/Volume config/User data volume”
2. Select UDVs by ticking the checkbox.
3. Click “ Delete ” and a confirmation window will pop up
4. Select “OK”
5. OK. A UDV has been deleted

Remind : When a UDV is deleted, the attached LUN(s) related to this UDV will also be detached automatically.

Step 3 Delete VG (Volume Group)

To delete the VG, please follow the steps below.

1. Select “/Volume config/Volume group”
2. Select a VG by clicking the checkbox. Make sure that there is no UDV on this VG and the UDV(s) on this VG have been deleted.
3. Click “ Delete ” and a confirmation window will pop up.
4. Click “OK” to confirm

Step 4 Free dedicated spare disk

To free dedicated spare disks, please follow the steps below:

1. Select “/Volume config/Physical disk”
2. Select the dedicated spare disk by ticking the checkbox and then click “ Free disks ” to free the disk

Step 5 Delete dedicated cache volume

To delete the dedicated cache volume, please follow the steps below:

1. Select “/Volume config/Cache volume”
2. Select a CV by clicking the checkbox
3. Click “ Delete ” and a confirmation window will pop up
4. Select “OK”

Note : Global cache volume cannot be deleted

4.7 Enclosure Management

“Enclosure management” function allows the administrator to manage or obtain information about the hardware.

SES config	Access control for SES management
Hardware monitor	System monitored voltage, temperature and battery backup module
S.M.A.R.T.	Self-monitoring analysis and reporting technology for physical disks
UPS	Uninterruptible power supply

Figure 4.7.1

4.7.1 SES config

SES represents SCSI Enclosure Services. You can enter “SES config” function to enable or disable the management of SES.

	Host	LUN	Permission	UDV name
☐	*	0	Read write	(SES)

Figure 4.7.1

4.7.2 Hardware Monitor

Enter “Hardware Monitor” function to view the information of current voltage and temperature

Item	Information
+1.35V:	+1.36 V (min = +1.28 V, max = +1.47 V)
+3.3V:	+3.44 V (min = +3.03 V, max = +3.63 V)
+5V:	+5.14 V (min = +4.50 V, max = +5.50 V)
+12V:	+12.16 V (min = +10.80 V, max = +13.20 V)
+2.5V:	+2.61 V (min = +2.35 V, max = +2.85 V)
Core Processor:	+52.0 (C) (hyst = +0.0 (C), high = +70.0 (C))
Location 1:	+47.0 (C) (hyst = +0.0 (C), high = +65.0 (C))
Location 2:	+41.0 (C) (hyst = +0.0 (C), high = +65.0 (C))

Auto shutdown : ☑

Figure 4.7.2

If “Auto shutdown” has been checked, the system will shutdown automatically when voltage or temperature is out of the normal range. For better data protection, please enable the “Auto Shutdown” function.

4.7.3 Hard Drive S.M.A.R.T. Function Support

S.M.A.R.T. (Self-Monitoring Analysis and Reporting Technology) is a diagnostic tool for hard drives to give advanced warning of hard disks failures. It provides users chances to take actions before possible hard disks failure.

S.M.A.R.T. measures many attributes of the hard disk realtime and detects if the hard disk is moving out of threshold tolerance. The advanced notice of possible hard disk failure allows users to back up hard disk or replace the hard disk in advance. It prevent from hard disk crash when it is writing data or rebuilding a failed hard disk.

After you enter the “S.M.A.R.T.” function, the S.M.A.R.T. information will be displayed. The number is the current value and the number in parenthesis is the default threshold value. The threshold values are different according to hard disk vendors. Please refer to the vendor’s specifications for details.

Slot	Read error rate	Spin up time	Reallocated sector count	Seek error rate	Spin up retries	Calibration retries	Temperature (C)	Status
1	200(51)	161(21)	200(140)	200(51)	100(51)	100(51)	35	Good
2	200(51)	161(21)	200(140)	200(51)	100(51)	100(51)	37	Good
3	103(6)	85(0)	100(36)	55(30)	100(97)		44	Good
4	100(6)	97(0)	100(36)	59(30)	100(97)		43	Good

Figure 4.7.3

4.7.4 UPS

You can enter “UPS” function to configure UPS (Uninterruptible Power Supply).

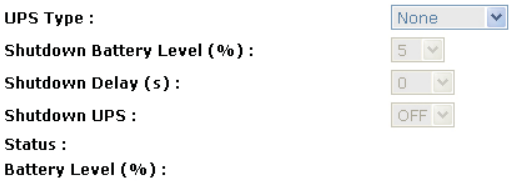


Figure 4.7.4

Currently, the system only support the smart-UPS (Auto Shutdown) function of APC (American Power Conversion Corp.). For more information, visit http://www.apc.com/.

To setup the UPS, connect the system to APC UPS via RS-232 for communication. Configure the shutdown values when power failure. UPS of other vendors do not support auto shutdown.

UPS Type	Select UPS Type. Choose Smart-UPS for APC Smart-UPS or choose “None” for other vendors.
Shutdown Battery Level (%)	When below the specified level, the system will shut down automatically. Setting the value to “0” will disable the UPS function.

Shutdown Delay (s)	If power failure occurs, and the system cannot return back after the specified period of time, the system will shut down automatically. Setting the value to “0” will disable this function.
Shutdown UPS	If ON is selected, when power is gone, UPS will shut down automatically after the system shuts down successfully. After power comes back, UPS will start working and notify the system to boot up. Selecting “OFF” will disable this function.
Status	The status of UPS. “Detecting…” “Running” “Unable to detect UPS” “Communication lost” “UPS reboot in progress” “UPS shutdown in progress” “Batteries failed. Please change them NOW!”
Battery Level (%)	Current battery power %.

4.8 Maintenance

”Maintenance” function provides system maintenance information to the system’s administrator.

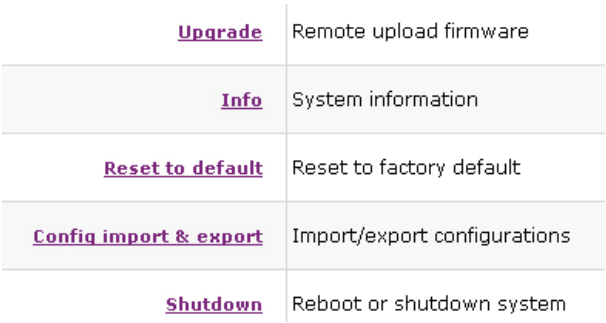


Figure 4.8

4.8.1 Upgrade

The “Upgrade” function allow you to upgrade firmware and export the configuration file for backup purposes.

To Export the configuration file, click "Export Config" and save to your desired location.

To Firmware Update:
1. Prepare your new firmware file named “xxxx.bin”. File can be obtain in www.sansdigital.com
2. Click Browse... to select the file.
3. Click Confirm , the system will automatically start and complete the upgrade.

Figure 4.8.1

During the upgrade, a status window will appear. The system will reboot after the update.

Remind : If currently your system is working properly, upgrading firmware is optional. For the latest version of the firmware, please contact support@sansdigital.com.

4.8.2 Info

You can click the “Info” function to view current system information.

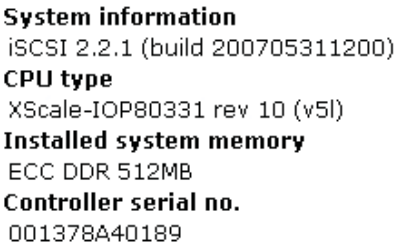


Figure 4.8.2

4.8.3 Reset to default

You can click the “Reset to default” function to restore your system to factory defaults.

4.8.4 Configuration import & export

You can click the “Config import & export” function to import/export the configurations.

Figure 4.8.4.

4.8.5 Shutdown

After you enter the “Shutdown” function, it will display the “REBOOT” and “SHUTDOWN” buttons. Before power off or restart, it is recommended to "REBOOT" or "SHUTDOWN" to flush the data from cache to physical disks. This will keep the integrity of the data.

Figure 4.8.5

4.9 Logout

For security reason, “Logout” function will exit the management console. To login to the system, input user name and password again.

Chapter 5 Advanced Operation

5.1 Rebuild

When A Volume Group (VG) is protected by RAID level (e.g.: RAID 3, RAID 5, or RAID 6), if one physical disk has been failed, unplugged or removed, the VG status is changed to rebuild. The system will search for available space to rebuild the data to ensure data integrity. It will use the dedicated spare disk as rebuild disk first, then the global spare disk.

Sans Digital iSCSI Series Products support the Auto-Rebuild function. When the RAID level degraded or fail, Sans Digital iSCSI Series Products start Rebuild automatically.

For example, if a RAID 6 is setup:

1. When there is no global spare disk or dedicated spare disk on the system, Sans Digital iSCSI Series Products will be in degraded mode and wait until
   (A) one hard disk is assigned as spare hard disk,
   (B) the failed hard disk is replaced with new clean hard disk.
   An Auto-Rebuild process will starts automatically when either of the above occur. The new disk will be a spare disk to the original VG .

   If the new added hard disk is not clean (with unknown VG information), it would be marked as RS (reserved) and the system will not start the Auto-Rebuild.

   If the disk is belonging to existing VG, it would be FR (Free) disk and the system will start Auto-Rebuild.

2. When there is enough global spare disk(s) or dedicated spare disk(s), Sans Digital iSCSI Series Products will start Auto-Rebuild immediately. In RAID 6 level, if there is another disk failure during the rebuilding process, Sans Digital iSCSI Series Products will complete the rebuild regardless. The Auto-Rebuild feature works at realtime to prevent a conflict with the “Roaming” function.

In degraded mode, the status of VG is “DG”.

When rebuilding, the status of PD/VG/UDV will display “R”, and “R%” in UDV will display rebuild status in percentage. After rebuilding is complete, “R” and “DG” will disappear. And the VG will back to normal.

Note : If there is no VG or only the VG under RAID 0 or JBOD mode, rebuild is not avaliable.

Sometimes "Rebuild" is also known as "Recover". The following table describes the relationship between RAID levels and rebuilding.

RAID 0	(striping). No data protection. Data is damaged or inaccessible if any hard disk fails or is unplugged.
RAID 1	(mirroring). Allows one hard disk to fail or being unplugged. One new hard disk is required to insert to the system to complete the rebuilding.
N-way mirror	Extension of RAID 1 level. It has N copies of the disks and allows N-1 hard disks to fail or being unplugged.
RAID 3	(striping with parity). Allows one hard disk to fail or being unplugged.

RAID 5	(striping with interspersed parity). Allows one hard disk to fail or being unplugged.
RAID 6	(2-dimensional parity protection). RAID 6 allows two hard disks to fail or being unplugged. If two hard disks need to be rebuilt at the same time, it will rebuild the first one and then the other one.
RAID 0+1	(mirroring of the member RAID 0). Allows two hard disks to fail or being unplugged, but the hard disks must in the same array.
RAID 10	(striping over the member RAID 1). Allows two hard disks to fail or being unplugged, but the hard disks must in different array.
RAID 30	(striping over the member RAID 3). Allows two hard disks to fail or being unplugged, but the hard disks must in different array.
RAID 50	(striping over the member RAID 5). Allows two hard disks to fail or being unplugged, but the hard disks must in different array.
RAID 60	(striping over the member RAID 6). Allows four hard disks to fail or being unplugged, but no more than two hard disks in same array.
JBOD	The abbreviation of "Just a Bunch Of Disks". No data protection. Data is damaged or inaccessible if any hard disk fails or is unplugged.

5.2 VG Migration and Expansion

VG Migration/Expansion allow you to change from one RAID level to another, or expand current RAID level to additional Hard drives. To migrate the RAID level, follow the steps below.

1. Click "/Volume config/Volume group"
2. Select the VG to be migrated and click " " button in the RAID field
3. Change the RAID level by clicking the " RAID 5 " down list. If the hard disk capacity is not enough to support the new RAID level, a request to add more PD will pop up. Click " Select PD " to add hard disks and click " Confirm " to go back to the configure page.
   When migrating to lower RAID level, such as the migration from RAID 6 to 0, data will be lost. the system will evaluate if this operation is safe and display the "Sure to migrate to a lower protection array?" to warn you.
4. Double check the configuration. If there is no change needed, click " Next >> ".
5. A confirmation page will show detailed RAID data. If there is no change needed, click " Confirm " to start the migration.
6. In the "status 3" field, you can view the migration status and the letter "M" will be displayed. In "/Volume config/User data volume", a "M" and progress percentage "R%" will be displayed in "Status 3".

	No.	Name	Total (GB)	Free (GB)	#PD	#UDV	Status	1	2	3	RAID
☐	1	SANS DIGITAL	222	0	3	1	Online			M	RAID 0

Figure 5.2.1

Remind : To migrate/expand, the total volume of VG must be larger or equal to the original VG. It does not allow the hard disks with the same RAID level and the same original VG to expand.
When configuring the migration, if the settings are incorrect, the system will pop up a warning window described as below:
"Invalid VG ID": Source VG error
"Degrade VG not allowed": Source VG is degraded
"Initializing/rebuilding operation's going": Source VG is initialing or rebuilding
"Migration operation's going": Source VG is doing migration
"Invalid VG raidcell parameter": Structural error. For example, the size of a new VG is smaller than that of the original VG

Note : VG migration cannot be executed during data rebuilding or UDV expansion.

5.3 UDV Expansion

To expand UDV size, please follow the steps below.

1. Select “/Volume config/User data volume”
2. Select the UDV to be expanded and click the “ ” button next to the number in the Size field.
3. Change the volume size. The volume size must be larger than the original value. Then click “ ” to start expansion
4. Expansion starts. If UDV needs initialization, it will display an “I” in “Status 3” field and the progress percentage “R%”

Remind : The volume of UDV expansion must be larger than original value

Note : UDV expansion cannot be executed during rebuilding or migration

5.4 Disk roaming

Physical disks can exchange to different slot in the same system or be completely moved from system 1 to system 2. This is called disk roaming. Disk roaming is restricted by the following conditions:

1. Check the firmware version of the two systems. It is recommended that both systems are using the same firmware.
2. The VG included in whole physical disks should be moved together. The architectures of the VG and UDV will be kept but LUN architecture will be cleared to avoid conflict with system 2.

5.5 Support Microsoft MPIO and MC/S

MPIO (Multi-Path Input/Output) and MC/S (Multiple Connections per Session) both use multiple physical paths to create logical paths between the server and the storage device. Under regular use, in case one or more connections fail, the transmission is supposed to stop. But multi-path users can adopt an alternate path for I/O to make sure that the data access is still working.

Microsoft iSCSI initiator supports multi-path function, please follow the steps below to use the MPIO function.

1. A host with dual LAN ports is connected to Sans Digital iSCSI Series Products
2. Create a VG/UDV and attach this UDV to the host
3. When install “Microsoft iSCSI initiator”, install MPIO driver at the same time
4. Login to target separately on each port. When login to target, confirm “Enable multi-path”. Please refer to step 6 in Appendix D
5. MPIO mode can be selected by Targets → Details → Devices → Advanced
6. Rescan the disk
7. There will be one disk running MPIO

For detailed configure steps, please refer to Appendix E: MPIO and MC/S Configure Instructions. The configure steps for MC/S are very similar to that for MPIO, please refer to Appendix E.

Chapter 6 Application Description

As Sans Digital iSCSI Series Products supports dual Gigabit ports, it provides more extensive applications. The following are the examples:

6.1 Sharing Resources

Since iSCSI is using IP based, you can connect Sans Digital iSCSI Series Products to multipule computer using IP network. Once all the computers in the network are installed with initiator, they can use Sans Digital iSCSI Series Products as local hard disks. Please refer to Figure 6.1.

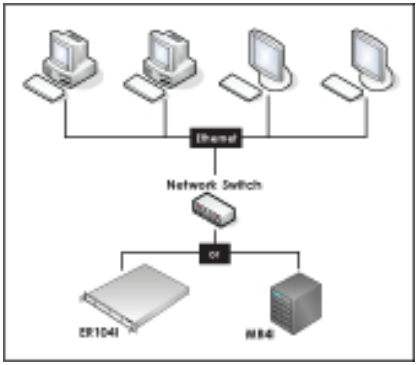


Figure 6.1

The benefit of this type of connection is that each computer in the network now can use Sans Digital iSCSI Series Products as local hard disks. Please note that the iSCSI device only support write only in the same LUN or data corruption will occur. Alternatively, SAN software can be installed for write and read in the same LUN.

Note : In one local area network, the computers that is using Sans Digital iSCSI Series Products must installed with initiator. When two computers or above write into the same file at the same time, it may cause the file corruption.

6.2 Easy Storage Capacity Expansion

Sans Digital iSCSI Series Products are equipped with 4 eSATA extension interface. When your existing storage volume is not enough, you can add a 4 bays JBOD system, such as MS4T and ES104T to upgrade your storage RAID system to 8 bays. It is easy for you to expand the volume anytime.

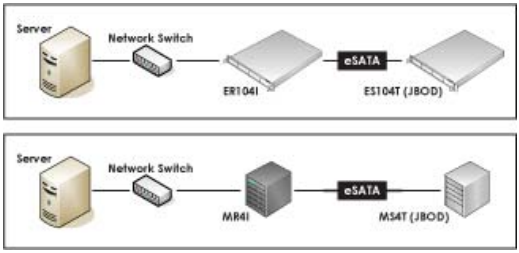


Figure 6.2

6.3 Remote Access

As the Sans Digital iSCSI Series Products are implemented based on IP, they support the network “remote access”. Simply configure the appropriate IP addresses and permissions, you can connect to the Sans Digital iSCSI Series Products from anywhere of the world for the data access or remote configuration.

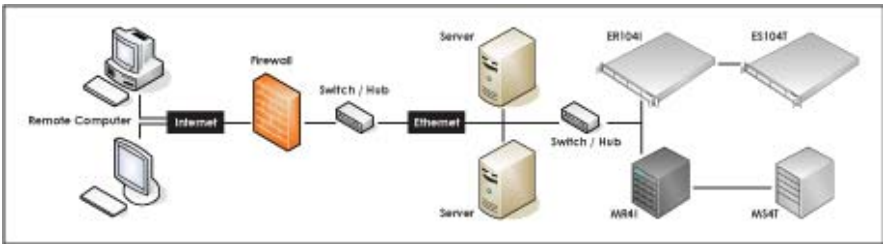


Figure 6.3

Appendix

A. Certification list

- RAM

  RAM Spec: 184pins, DDR333(PC2700), Reg.(register) or UB(unbuffer), ECC or Non-ECC.

Vendor	Model
Unigen	UG732D6688KN-DH, 256MB DDR333 (UB)
Unigen	UG732D7588KZ-DH, 256MB DDR333 (Reg, ECC)
Unigen	UG764D7588KZ-DH, 512MB DDR333 (Reg, ECC)
Unigen	UG7128D7588LZ-DH, 1GB DDR333 (Reg, ECC)
Unigen	UG732D6688KS-DH, 256MB DDR333 (UB)
Unigen	UG764D6688LS-DH, 512MB DDR333 (UB)
Trenscend	256MB DDR333 (Reg ECC)
Trenscend	512MB DDR333 (Reg ECC)
Trenscend	1GB DDR333 (Reg ECC)

- iSCSI HBA card

Vendor	Model
Adaptec	7211C (Gigabit, 1 port, TCP/IP offload, iSCSI offload)
QLogic	QLA4010C (Gigabit, 1 port, TCP/IP offload, iSCSI offload)

  For detailed setup steps of Qlogic QLA4010C, please refer to Appendix F: QLogic QLA4010C setup instructions.

- NIC

Vendor	Model
Intel	PWLA8490MT (Gigabit, 1 port, TCP/IP offload)
Intel	PWLA8492MT (Gigabit, 2 port, TCP/IP offload)
Intel	PWLA8494MT (Gigabit, 4 port, TCP/IP offload)

- SATA hard drive

Vendor	Model
Hitachi	Deskstar 7K250, HDS722580VLSA80, 80GB, 7200RPM, SATA, 8M
Hitachi	Deskstar 7K80, HDS728080PLA380, 80GB, 7200RPM, SATA-II, 8M
Hitachi	Deskstar 7K500, HDS725050KLA360, 500G, 7200RPM, SATA-II, 16M
Hitachi	Deskstar 7K80, HDS728040PLA320, 40G, 7200RPM, SATA-II, 2M
Maxtor	DiamondMax Plus 9, 6Y080M0, 80G, 7200RPM, SATA, 8M
Maxtor	DiamondMax 11, 6H500F0, 500G, 7200RPM, SATA 3.0Gb/s, 16M
Samsung	SpinPoint P80, HDSASP0812C, 80GB, 7200RPM, SATA, 8M
Seagate	Barracuda 7200.7, ST380013AS, 80G, 7200RPM, SATA, 8M
Seagate	Barracuda 7200.7, ST380817AS, 80G, 7200RPM, SATA, 8M, NCQ
Seagate	Barracuda 7200.8, ST3400832AS, 400G, 7200RPM, SATA, 8M, NCQ
Seagate	Barracuda 7200.9, ST3500641AS, 500G, 7200RPM, SATA-II, 16M

Western Digital	Caviar SE, WD800JD, 80GB, 7200RPM, SATA, 8M
Western Digital	Caviar SE, WD1600JD, 160GB, 7200RPM, SATA, 8M
Western Digital	Raptor, WD360GD, 36.7GB, 10000RPM, SATA, 8M
Western Digital	Caviar RE2, WD4000YR, 400GB, 7200RPM, SATA, 16M, NCQ

B. Event notifications

- PD/S.M.A.R.T. events

Level	Type	Description
Info	Disk inserted	Info: Disk <slot> is inserted.
Info	Disk removed	Info: Disk <slot> is removed.
Warning	S.M.A.R.T. threshold exceed condition	Warning: S.M.A.R.T. threshold exceed condition occurred.

- Physical HW events

Level	Type	Description
Warning	ECC error	Warning: Single-bit ECC error is detected.
Error	ECC error	Error: Multi-bit ECC error is detected.
Info	ECC DIMM Installed	Info: ECC Memory is installed.
Info	Non-ECC installed	Info: Non-ECC Memory is installed.
Error	Host chip failure	Error: Host channel chip failed.
Error	Drive chip failure	Error: Drive channel chip failed.
Warning	Ethernet port failure	Warning: GUI Ethernet port failed.

- HDD IO events

Level	Type	Description
Warning	Disk error	Error: Disk <slot> read block error.
Warning	Disk error	Error: Disk <slot> writes block error.
Warning	HDD failure	Error: Disk <slot> is failed.
Warning	Channel error	Error: Disk <slot> IO incomplete.

- SES events

Level	Type	Description
Info	SES load conf. OK	Info: SES configuration has been loaded.
Warning	SES Load Conf. Failure	Error: Failed to load SES configuration. The SES device is disabled.
Info	SES is disabled	Info: The SES device is disabled.
Info	SES is enabled	Info: The SES device is enabled

- Environmental events

Level	Type	Description
Info	Admin Login OK	Info: Admin login successfully.
Warning	Admin Login Fail	Warning: Admin fails to login.
Info	Admin Logout OK	Info: Admin logout successfully.
Warning	Admin Logout Fail	Warning: Admin fails to logout.
Error	Thermal critical	Error: System Overheated!!! The system will auto shutdown immediately.

Warning	Thermal warning	Warning: System temperature is a higher than normal.
Error	Voltage critical	Error: System voltages failed!!! The system will auto shutdown immediately
Warning	Voltage warning	Warning: System voltage is higher/lower than normal
Info	PSU restore	Info: Power <number> is restored to work.
Error	PSU Fail	Error: Power <number> is out of order.
Info	Fan restore	Info: Fan <number> is restore to work.
Error	Fan Fail	Error: Fan <number> is out of order.
Error	Fan non-exist	Error: System cooling fan is not installed.
Error	AC Loss	Error: AC loss for the system is detected.
Error	UPS power low	Error: UPS Power Low!!! The system will auto shutdown immediately.
Info	Mgmt LAN Port Active	Info: Management LAN Port is active.
Warning	Mgmt LAN Port Failed	Warning: Fail to manage the system via the LAN Port.
Info	RTC Device OK	Info: RTC device is active.
Warning	RTC Access Failed	Warning: Fail to access RTC device
Info	Reset Password	Info: Reset Admin Password to default.
Info	Reset IP	Info: Reset network settings set to default.

- System config events

Level	Type	Description
Info	Sys Config. Defaults Restored	Info: Default system configurations restored.
Info	Sys NVRAM OK	Info: The system NVRAM is active.
Error	Sys NVRAM IO Failed	Error: Can't access the system NVRAM.
Warning	Sys NVRAM is full	Warning: The system NVRAM is full.

- System maintenance events

Level	Type	Description
Info	Firmware Upgraded	Info: System firmware has been upgraded
Error	Firmware Upgraded Failed	Error: System firmware upgrade failed.
Info	System reboot	Info: System has been rebooted
Info	System shutdown	Info: System has been shutdown.
Info	System Init OK	Info: System has been initialized OK.
Error	System Init Failed	Error: System cannot be initialized in the last boot up.

- LVM events

Level	Type	Description
Info	VG Created OK	Info: VG <name> has been created.
Warning	VG Created Fail	Warning: Fail to create VG <name>.
Info	VG Deleted	Info: VG <name> has been deleted.
Info	UDV Created OK	Info: UDV <name> has been created.
Warning	UDV Created Fail	Warning: Fail to create UDV <name>.

Info	UDV Deleted	Info: UDV <name> has been deleted.
Info	UDV Attached OK	Info: UDV <name> has been LUN-attached.
Warning	UDV Attached Fail	Warning: Fail to attach LUN to UDV <name>.
Info	UDV Detached OK	Info: UDV <name> has been detached.
Warning	UDV Detached Fail	Warning: Fail to detach LUN from Bus <number> SCSI_ID <number> LUN <number>.
Info	UDV_OP Rebuild Started	Info: UDV <name> starts rebuilding.
Info	UDV_OP Rebuild Finished	Info: UDV <name> completes rebuilding.
Warning	UDV_OP Rebuild Fail	Warning: Fail to complete UDV <name> rebuilding.
Info	UDV_OP Migrate Started	Info: UDV <name> starts migration.
Info	UDV_OP Migrate Finished	Info: UDV <name> completes migration.
Warning	UDV_OP Migrate Failed	Warning: Fail to complete UDV <name> migration.
Warning	VG Degraded	Warning: VG <name> is under degraded mode.
Warning	UDV Degraded	Warning: UDV <name> is under degraded mode.
Info	UDV Init OK	Info: UDV <name> completes the initialization.
Warning	UDV_OP Stop Initialization	Warning: Fail to complete UDV <name> initialization.
Warning	UDV IO Fault	Error: IO failure for stripe number <number> in UDV <name>.
Warning	VG Failed	Error: Fail to access VG <name>.
Warning	UDV Failed	Error: Fail to access UDV <name>.
Warning	Global CV Adjustment Failed	Error: Fail to adjust the size of the global cache.
Info	Global Cache	Info: The global cache is OK.
Error	Global CV Creation Failed	Error: Fail to create the global cache.
Info	UDV Rename	Info: UDV <name> has been renamed as <name>.
Info	VG Rename	Info: VG <name> has been renamed as <name>.
Info	Set VG Dedicated Spare Disks	Info: Assign Disk <slot> to be VG <name> dedicated spare disk.
Info	Set Global Disks	Info: Assign Disk <slot> to the Global Spare Disks.
Info	UDV Read-Only	Info: UDV <name> is a read-only volume.
Info	WRBK Cache Policy	Info: Use the write-back cache policy for UDV <name>.
Info	WRTHRU Cache Policy	Info: Use the write-through cache policy for UDV <name>.
Info	High priority UDV	Info: UDV <name> is set to high priority.
Info	Mid Priority UDV	Info: UDV <name> is set to mid priority.
Info	Low Priority UDV	Info: UDV <name> is set to low priority.

C. FAQ

1. Microsoft MPIO doesn't support Windows XP and Windows 2000 Professional.

A : Only Windows Server 2003 or Windows 2000 server support MPIO.

2. You can successfully ping to the administration port but cannot access Web GUI.

A: Connect your network cable to the administration port before booting up the system. Reboot the system after the connection.

3. What should I do if I forgot the IP address and failed to login?

A : For MR4I, you can look it up via the LCM. For ES104I, refer to 3.3.2 to login to the administration interface via RS232 to look it up.

4. Do Sans Digital iSCSI Series Products require additional driver upon different operation system?

A : There is no need for additional driver if your network interface card is properly installed. However, in order to use Sans Digital iSCSI Series Products with the optimal performance, select a hardware network card compliant to IEEE 802.3 1000 BASE-T technical standards (Gigabit NIC).

5. Are Sans Digital iSCSI Series Products compatible with any hard disks?

A : Please refer to Appendix A for the disk certification list. The hard disks that support SATA standard will be compatible. If you have found any disk compatible question, please feel free to contact support@sansdigital.com

6. Why is my data transmission performance poor?

A: If you have verified that all the hardware devices are configured properly, you should verify if the network devices, including network card, network cable, hub and switch, are compatible with IEEE 802.3 1000 BASE-T technical standards. 10/100 networking device will not provide optimal performance. You can also adjust the options like Stripe Size/Write or read/priority to improve the overall storage performance.

7. What should I do if I lost or forgot my password?

A : Please email to support@sansdigital.com to ask for assistance.

D. Microsoft iSCSI Initiator

The follow is the step by step to setup Microsoft iSCSI Initiator.

1. Run Microsoft iSCSI Initiator. Please see Figure D.1.
2. Click “Discovery”.

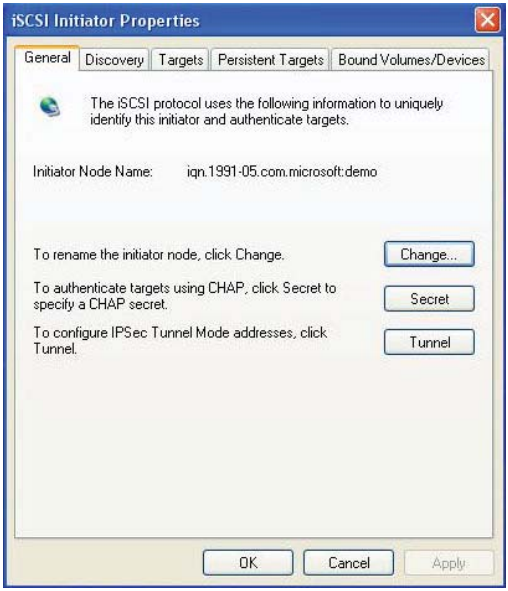


Figure D.1

3. Click “Add”. Input IP address or DNS name of iSCSI storage device. Please see Figure D.2.

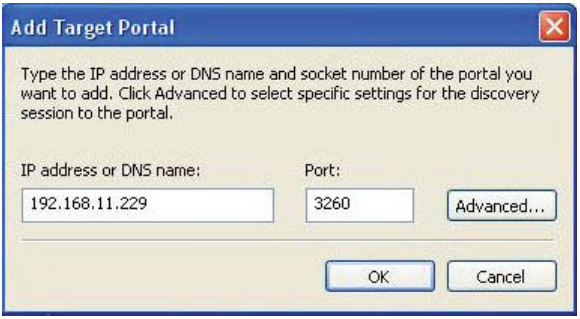

Add Target Portal
Type the IP address or DNS name and socket number of the portal you want to add. Click Advanced to select specific settings for the discovery session to the portal.
IP address or DNS name:
Port:
192.168.11.229
3260
Advanced...
OK
Cancel

Figure D.2

4. Click “OK”. Please see Figure D.3.

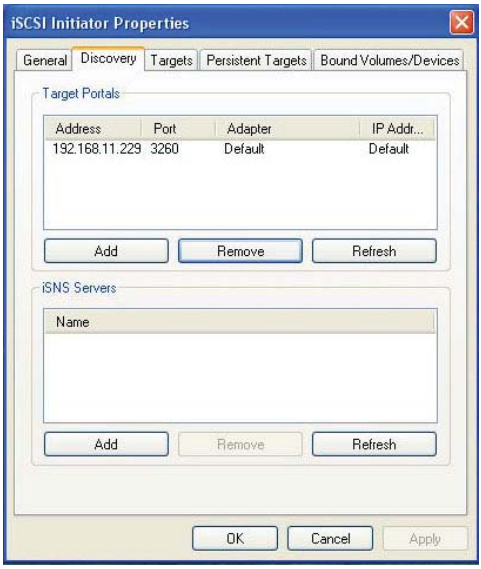


Figure D.3

5. Click “Targets”. Please see Figure D.4.

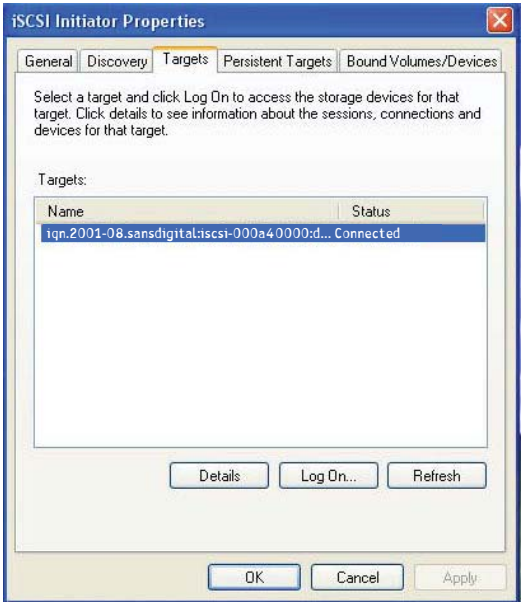


Figure D.4

6. Click “Log On”. Please see Figure D.5. Check “Enable multi-path” if running MPIO.

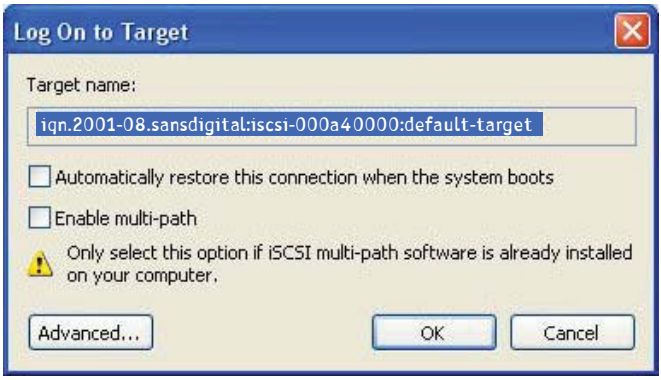


Figure D.5

7. Click “Advance” if CHAP information is needed. Please see Figure D.6.

Advanced Settings
General
IPSec
Connect by using
Local adapter:
Default
Source IP:
Default
Target Portal:
Default
CRC / Checksum
Data digest
Header digest
CHAP logon information
CHAP helps ensure data security by providing authentication between a target and an initiator trying to establish a connection. To use it specify the same target CHAP secret that was configured on the target for this initiator.
User name:
iqn.1991-05.com.microsoft:demo
Target secret:
Perform mutual authentication
To use mutual CHAP specify an initiator secret on the Initiator Settings page and configure that secret on the target.
OK
Cancel
Apply

Figure D.6

8. Click “OK”. The status would be “Connected”. Please see Figure D.7.

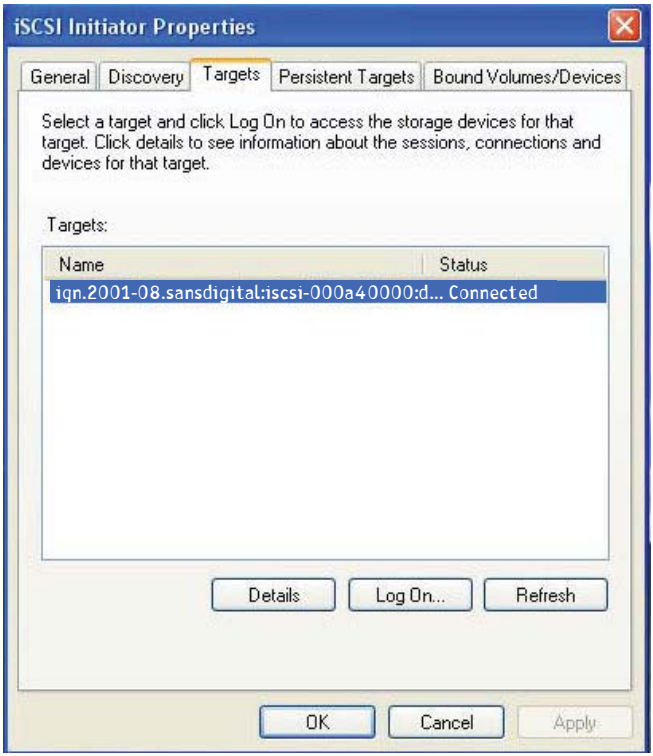


Figure D.7

The following procedure is to log off iSCSI device.

A. Click “Details”. Please see Figure D.8.

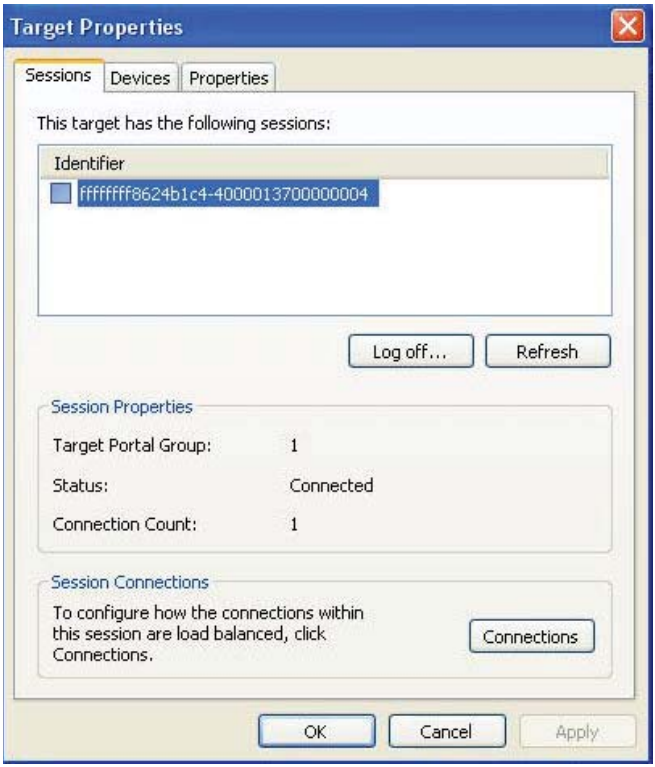


Figure D.8

B. Check the Identifier, which will be deleted.

C. Click “Log off”.

E. MPIO and MC/S setup instructions

Here is the step by step to setup MPIO. There are 2 kinds of scenarios for MPIO. Please see Figure E.1. Sans Digital suggests using scenario 2 for better performance.

• Network diagram of MPIO.

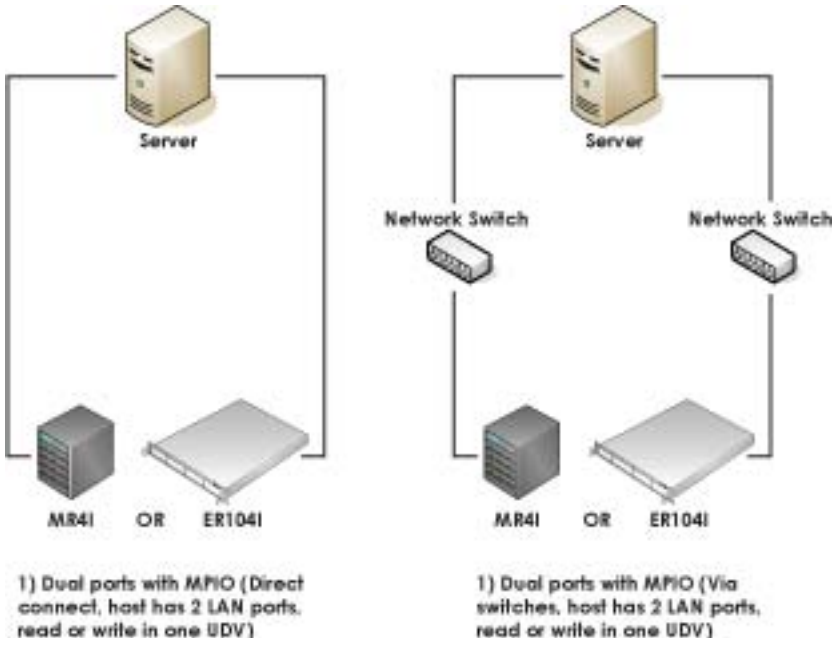

Server
MR4I
OR
ER104I
1) Dual ports with MPIO (Direct connect, host has 2 LAN ports, read or write in one UDV)
Server
Network Switch
Network Switch
MR4I
OR
ER104I
1) Dual ports with MPIO (Via switches, host has 2 LAN ports, read or write in one UDV)

Figure E.1

The setup instructions are in the following:

• Create a VG with RAID 5, using 3 HDDs.

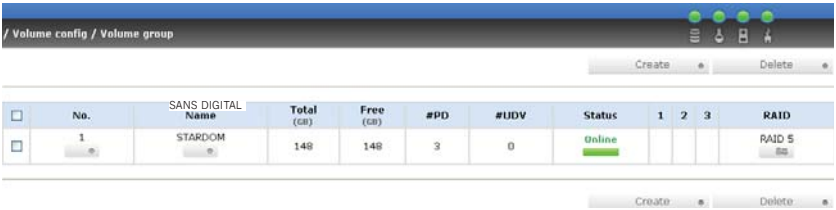


Figure E.2

• Create a UDV by using RAID 5 VG.

Figure E.3

• Run Microsoft iSCSI initiator and check the Initiator Node Name.

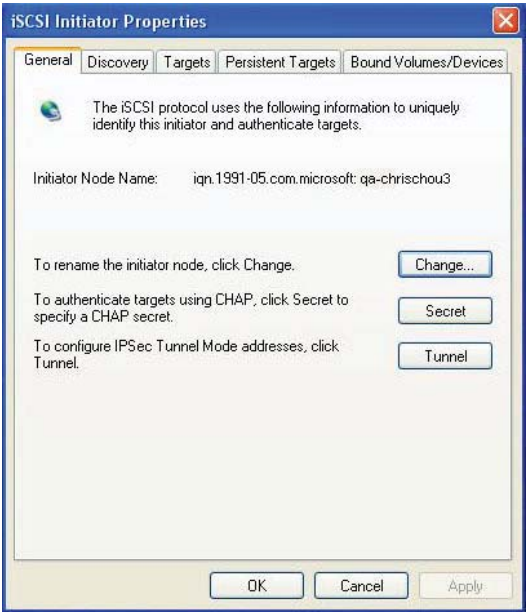


Figure E.4

• Attaching LUN to R5 UDV. Input the Initiator Node Name in Host field.

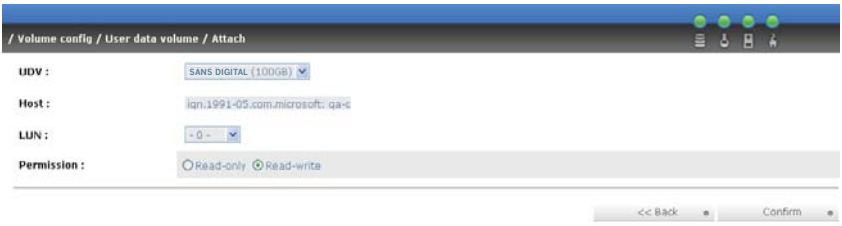


Figure E.5

• The volume config setting is done.

Figure E.6

• Check iSCSI settings. The IP address of iSCSI data port 0 is 192.168.11.229, port 1 is 192.168.12.229 for example.

Figure E.7

• Add Target Portals on Microsoft iSCSI initiator.

Figure E.8

• Input the IP address of iSCSI data port 0 (192.168.11.229 as mentioned in previous page).

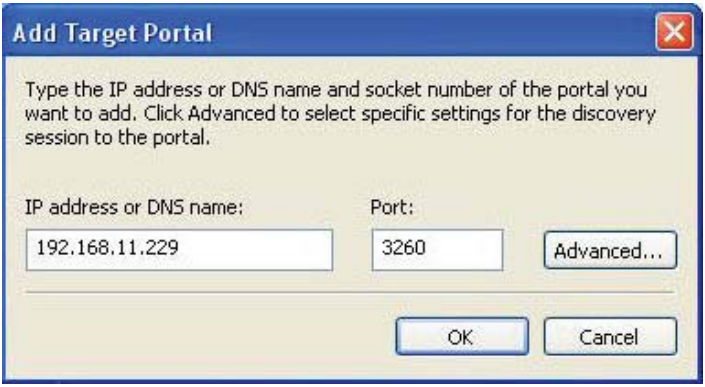

Add Target Portal
Type the IP address or DNS name and socket number of the portal you want to add. Click Advanced to select specific settings for the discovery session to the portal.
IP address or DNS name:
Port:
192.168.11.229
3260
Advanced...
OK
Cancel

Figure E.9

• Add second Target Portals on Microsoft iSCSI initiator.

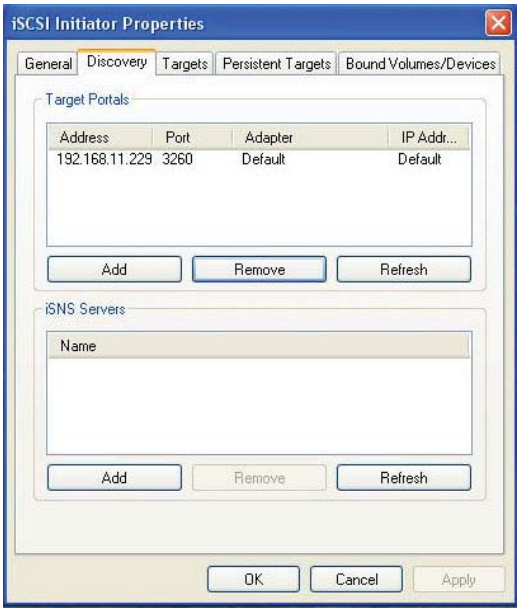


Figure E.10

• Input the IP address of iSCSI data port 1 (192.168.12.229 as mentioned in previous page).

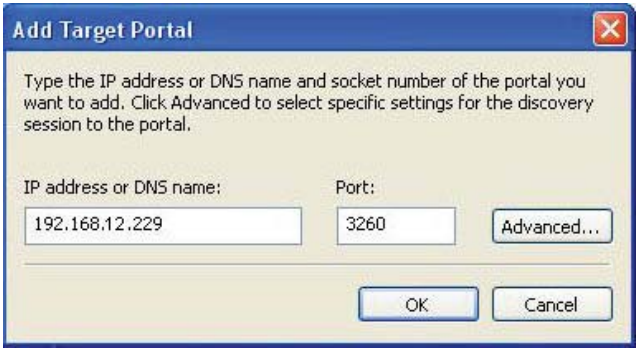

Add Target Portal
Type the IP address or DNS name and socket number of the portal you want to add. Click Advanced to select specific settings for the discovery session to the portal.
IP address or DNS name:
Port:
192.168.12.229
3260
Advanced...
OK
Cancel

Figure E.11

• The initiator setting is done.

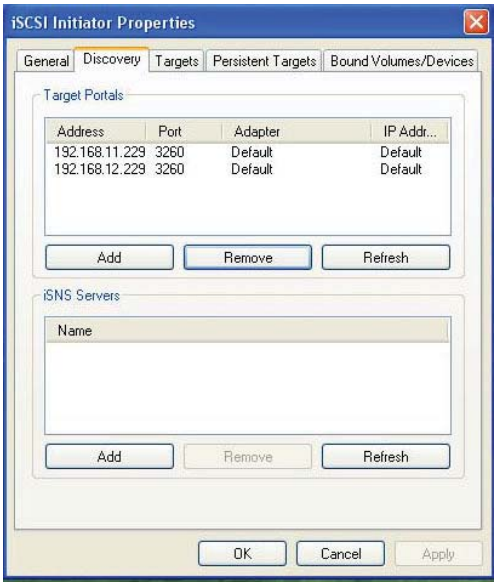


Figure E.12

• Log on.

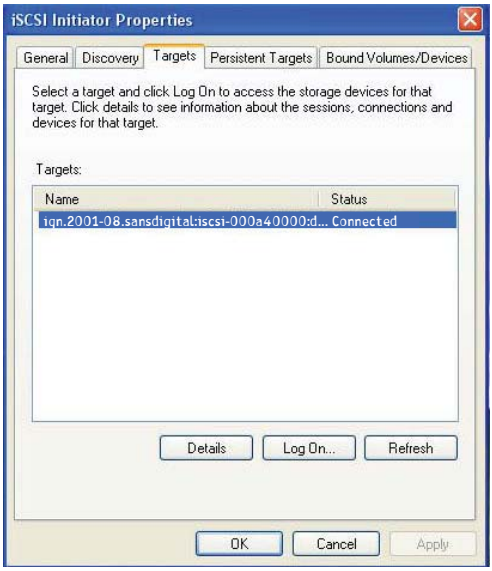


Figure E.13

• Enable “Enable multi-path” checkbox. Then click “Advanced”.

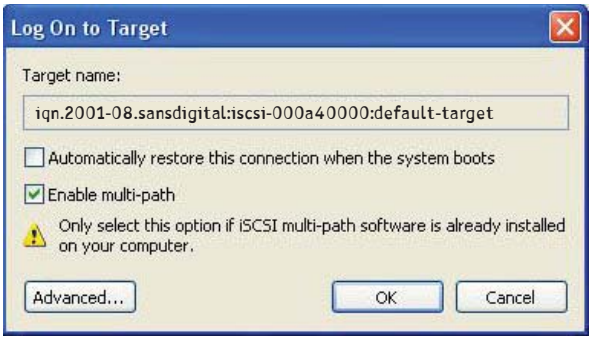


Figure E.14

• Select Target Portal to iSCSI data port 0 (192.168.11.229). Then click “OK”

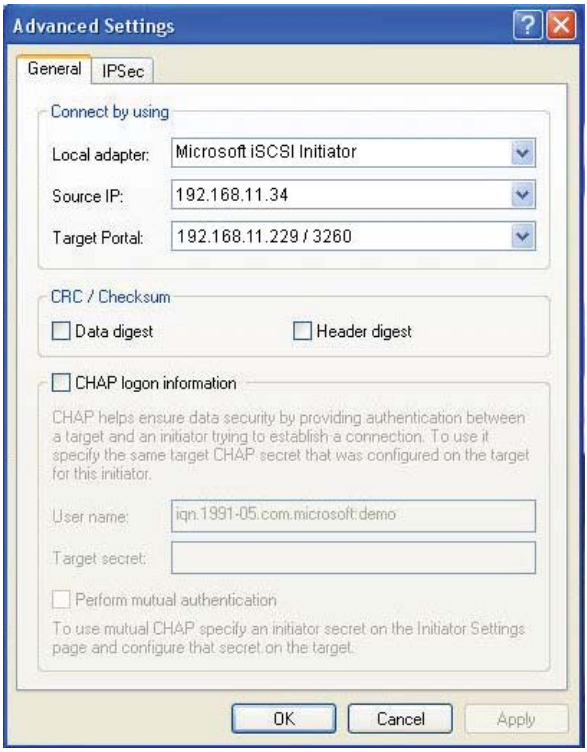

Advanced Settings
General
IPSec
Connect by using
Local adapter:
Microsoft iSCSI Initiator
Source IP:
192.168.11.34
Target Portal:
192.168.11.229 / 3260
CRC / Checksum
Data digest
Header digest
CHAP logon information
CHAP helps ensure data security by providing authentication between a target and an initiator trying to establish a connection. To use it specify the same target CHAP secret that was configured on the target for this initiator.
User name:
iqn.1991-05.com.microsoft:demo
Target secret:
Perform mutual authentication
To use mutual CHAP specify an initiator secret on the Initiator Settings page and configure that secret on the target.
OK
Cancel
Apply

Figure E.15

• Log on again.

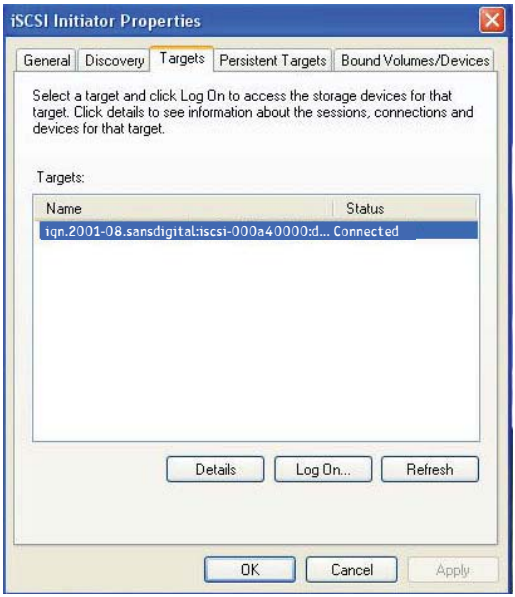


Figure E.16

• Enable “Enable multi-path” checkbox. Then click “Advanced”.

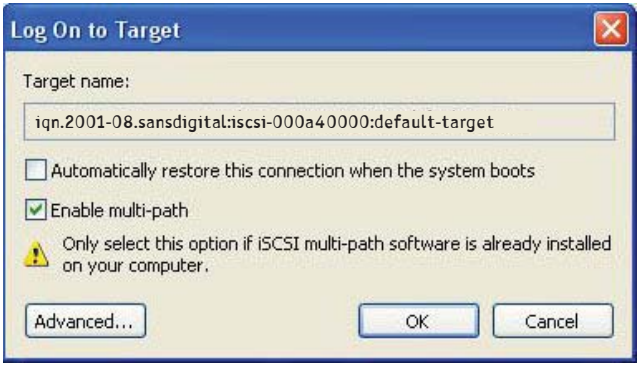


Figure E.17

• Select Target Portal to iSCSI data port 1 (192.168.12.229). Then select “OK”

Advanced Settings
General
IPSec
Connect by using
Local adapter:
Microsoft iSCSI Initiator
Source IP:
192.168.12.34
Target Portal:
192.168.12.229 / 3260
CRC / Checksum
Data digest
Header digest
CHAP logon information
CHAP helps ensure data security by providing authentication between a target and an initiator trying to establish a connection. To use it specify the same target CHAP secret that was configured on the target for this initiator.
User name:
iqn.1991-05.com.microsoft:demo
Target secret:
Perform mutual authentication
To use mutual CHAP specify an initiator secret on the Initiator Settings page and configure that secret on the target.
OK
Cancel
Apply

Figure E.18

• iSCSI device is connected. Click “Details”.

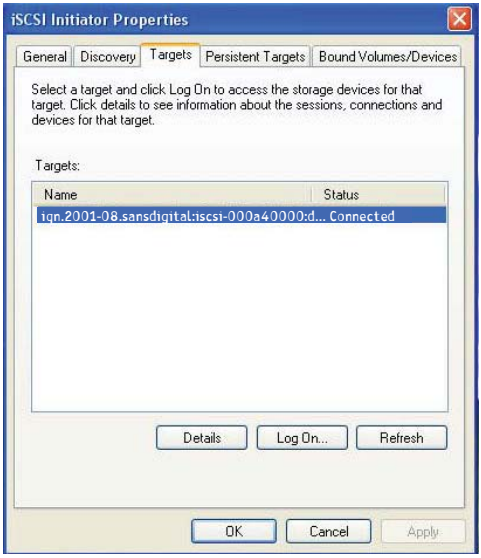


Figure E.19

• Click “Device” tab, then click “Advanced”.

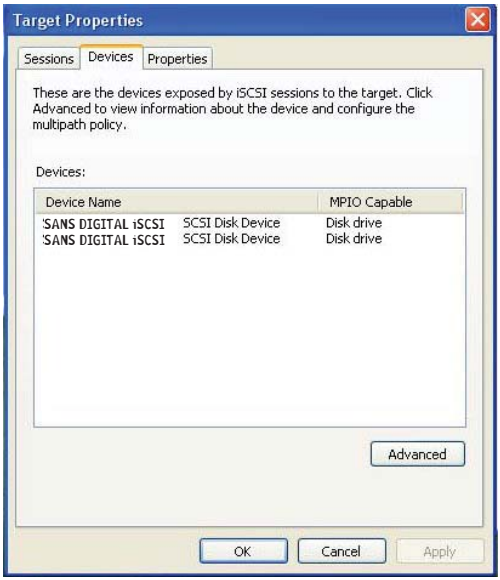


Figure E.20

• Click “MPIO” tab, select “Load Balance Policy” to “Round Robin”.

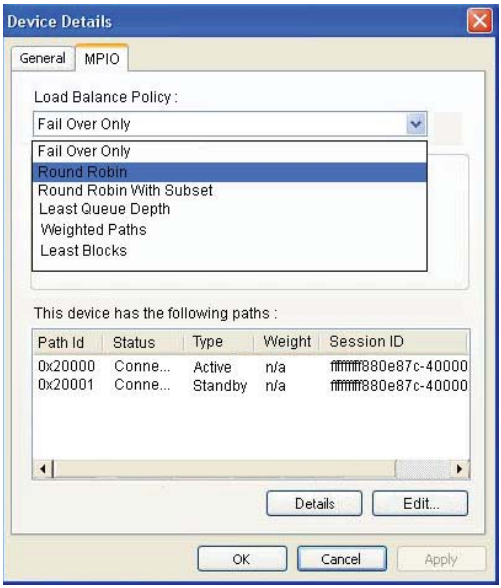


Figure E.21

• Click “Apply”.

Figure E.22

• Run “Device Manage” in Windows. Make sure MPIO device is available. The disk can be tested performance by IOMETER.

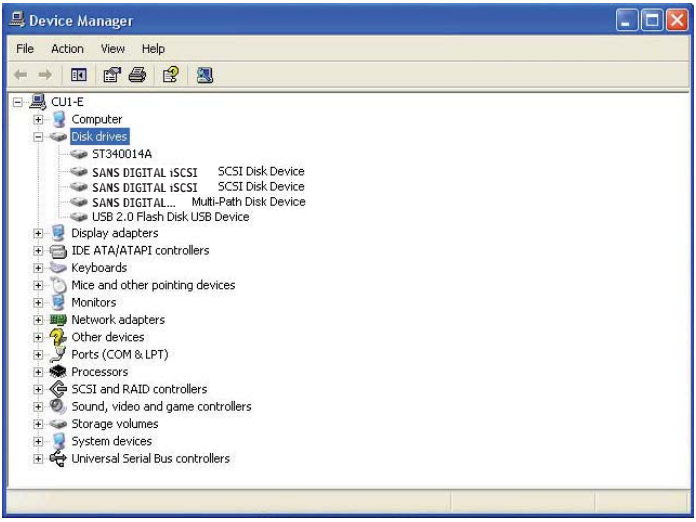


Figure E.23

The MC/S setup instructions are very similar to MPIO, detail steps are in the following. For the target side setting, the steps are exactly the same as MPIO. Please refer to Figure E.1 to Figure E.9.

- Create a VG with RAID 5, using 3 HDDs.
- Create a UDV by using RAID 5 VG.
- Run Microsoft iSCSI initiator 2.0 and check the Initiator Node Name.
- Attaching LUN to R5 UDV. Input the Initiator Node Name in Host field.
- The volume config setting is done.
- Check iSCSI settings. The IP address of iSCSI data port 0 is 192.168.11.229, port 1 is 192.168.12.229 for example.
- Add Target Portals on Microsoft iSCSI initiator 2.0.
- Input the IP address of iSCSI data port 0 (192.168.11.229 as mentioned in previous pages). For MC/S, there is only ONE “Target Portals” in the “Discovery” tab.

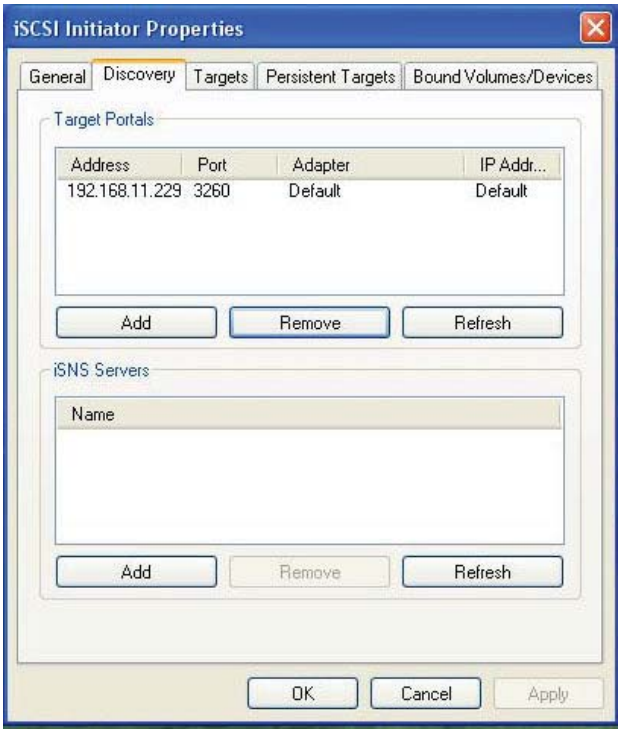


Figure E.24

• Log on.

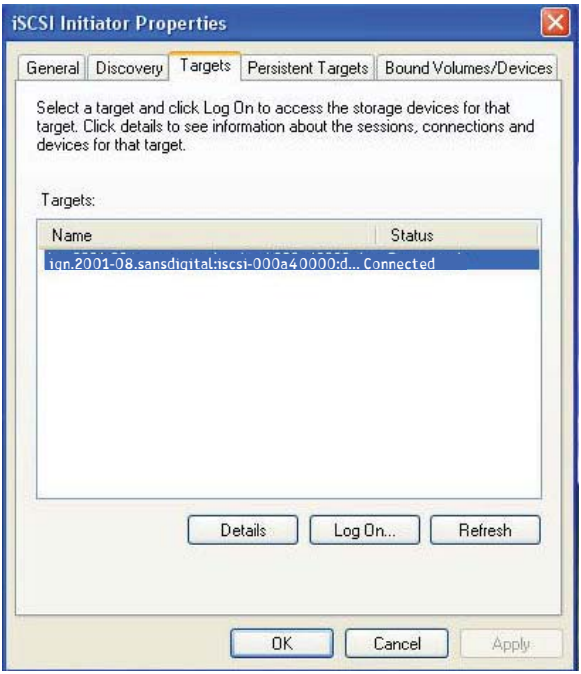


Figure E.25

• Then click “Advanced”.

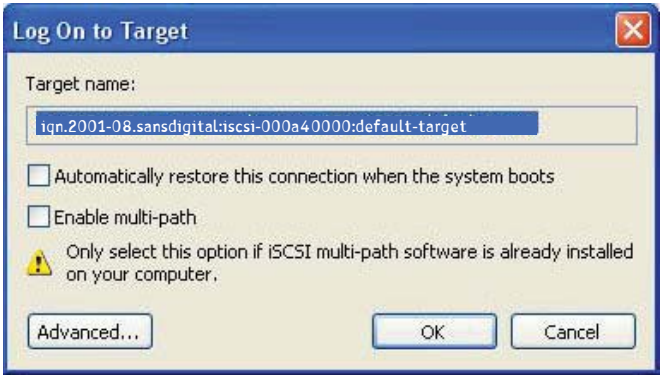


Figure E.26

• Select set Local Adapter, Source IP, and Target Portal to iSCSI data port 0 (192.168.11.229). Then click “OK”

Advanced Settings
General
IPSec
Connect by using
Local adapter:
Microsoft iSCSI Initiator
Source IP:
192.168.11.34
Target Portal:
192.168.11.229 / 3260
CRC / Checksum
Data digest
Header digest
CHAP logon information
CHAP helps ensure data security by providing authentication between a target and an initiator trying to establish a connection. To use it, specify the same target CHAP secret that was configured on the target for this initiator.
User name:
iqn.1991-05.com.microsoft:demo
Target secret:
Perform mutual authentication
To use mutual CHAP specify an initiator secret on the Initiator Settings page and configure that secret on the target.
OK
Cancel
Apply

Figure E.27

• After connected, click “Details”, then in the “Session” tab, click “Connections”

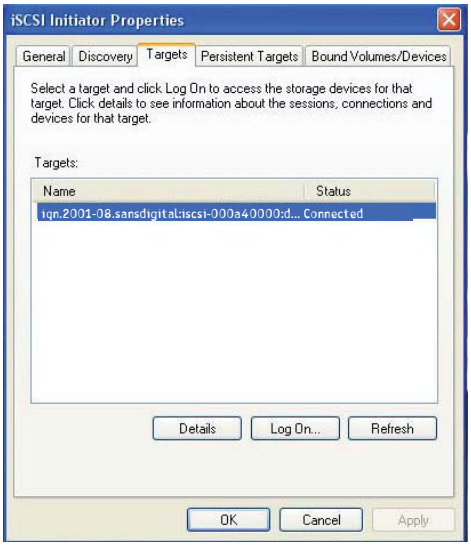


Figure E.28

• Choose “Round Robin” for Load Balance Policy

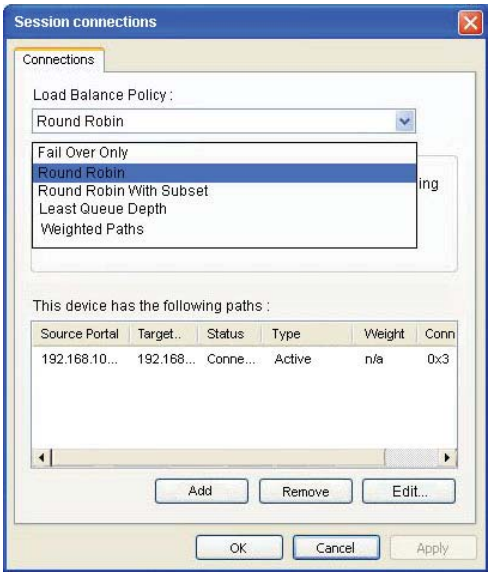


Figure E.29

• “Add” Source Portal for the iSCSI data port 1(192.168.12.229)

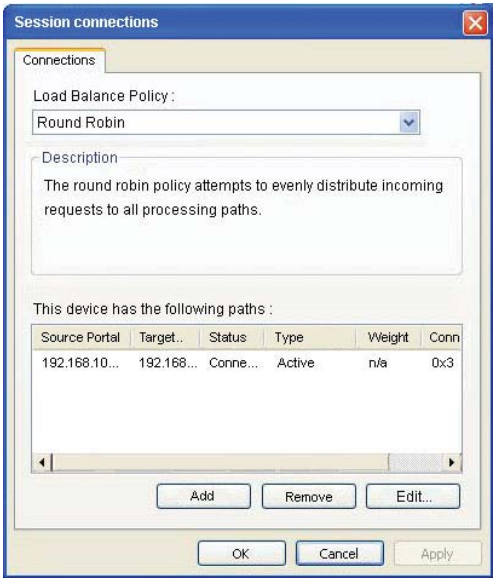


Figure E.30

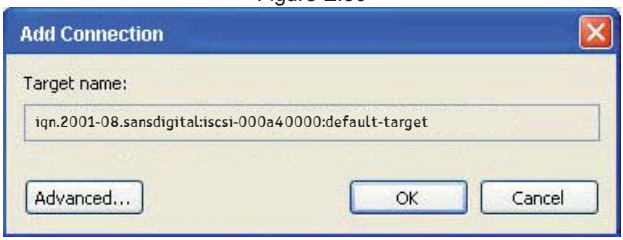


Figure E.31

• Select Local adapter, Source IP, and Target Portal to iSCSI data port 1 (192.168.12.229). Then select “OK”

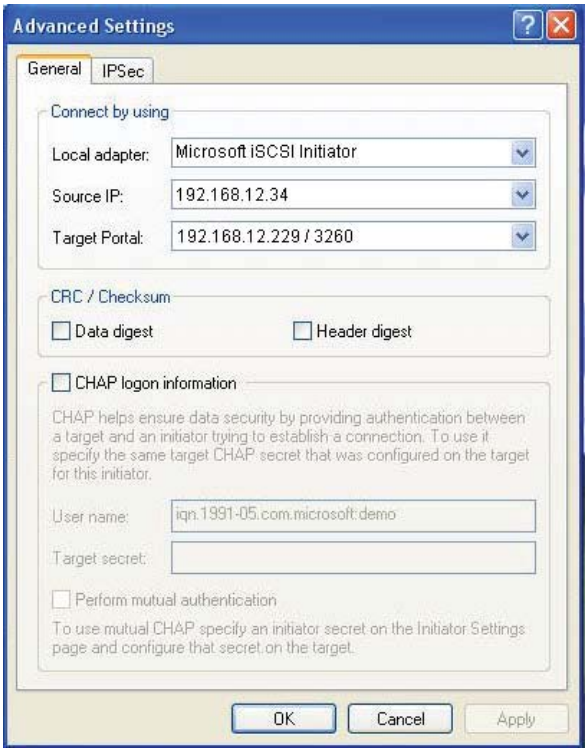

Advanced Settings
General
IPSec
Connect by using
Local adapter:
Microsoft iSCSI Initiator
Source IP:
192.168.12.34
Target Portal:
192.168.12.229 / 3260
CRC / Checksum
Data digest
Header digest
CHAP logon information
CHAP helps ensure data security by providing authentication between a target and an initiator trying to establish a connection. To use it specify the same target CHAP secret that was configured on the target for this initiator.
User name:
iqn.1991-05.com.microsoft:demo
Target secret:
Perform mutual authentication
To use mutual CHAP specify an initiator secret on the Initiator Settings page and configure that secret on the target.
OK
Cancel
Apply

Figure E.32

• The MC/S setting is complete.

F. QLogic QLA4010C setup instructions

The following is the step by step setup of Qlogic QLA4010C.

• Log on the iSCSI HBA Manager and the current state shows “No Connection Active”.

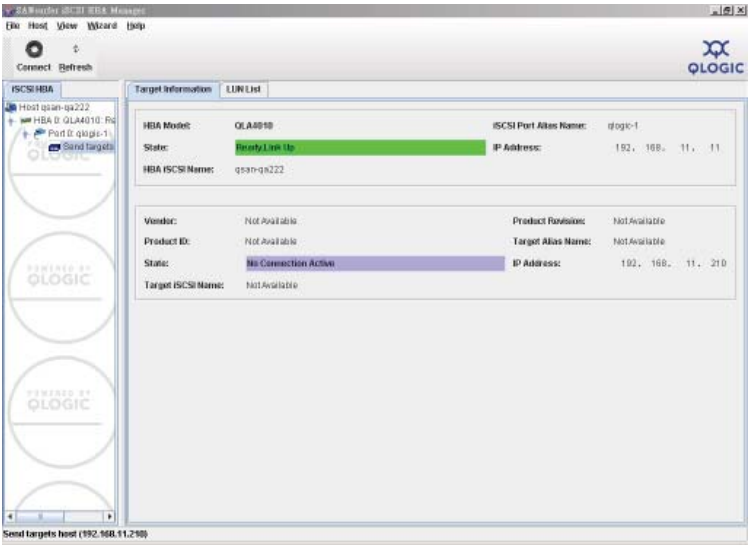


Figure F.1

• Click “Target settings”. Then select the target and click “Config Parameters”.

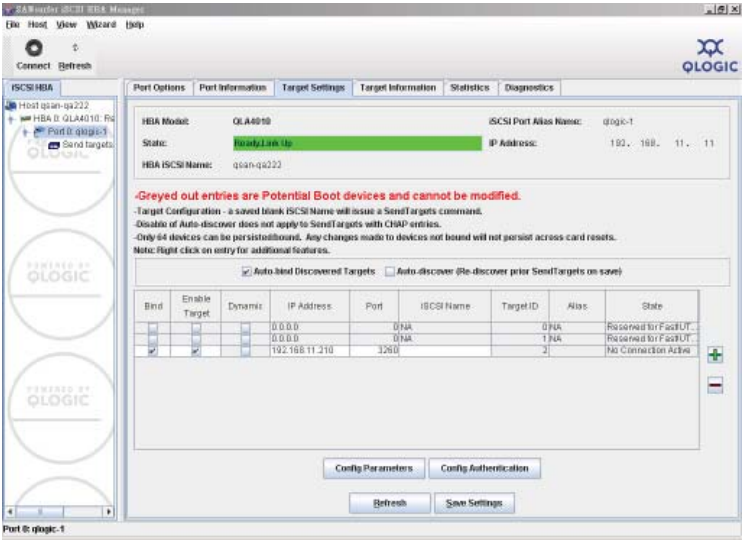

File Host View Wizard Help
Connect Refresh
QLOGIC
iSCSI HBA
Port Options
Port Information
Target Settings
Target Information
Statistics
Diagnostics
HBA Model: QLA4010
iSCSI Port Alias Name: qlogic-1
State: Ready,Link Up
IP Address: 192. 168. 11. 11
HBA iSCSI Name: qsan-qa222
-Greyed out entries are Potential Boot devices and cannot be modified.
-Target Configuration - a saved blank iSCSI Name will issue a SendTargets command.
-Disable of Auto-discover does not apply to SendTargets with CHAP entries.
-Only 64 devices can be persisted/bound. Any changes made to devices not bound will not persist across card resets.
Note: Right click on entry for additional features.
Auto-bind Discovered Targets
Auto-discover (Re-discover prior SendTargets on save)
Bind
Enable Target
Dynamic
IP Address
Port
iSCSI Name
Target ID
Alias
State
0.0.0.0 0 N/A 0 N/A Reserved for FastUT...
0.0.0.0 0 N/A 1 N/A Reserved for FastUT...
192.168.11.210 3260 2 No Connection Active
Config Parameters
Config Authentication
Refresh
Save Settings
Port 0: qlogic-1

Figure F.2

• Disable “Immediate Data” and enable “Initial R2T”.

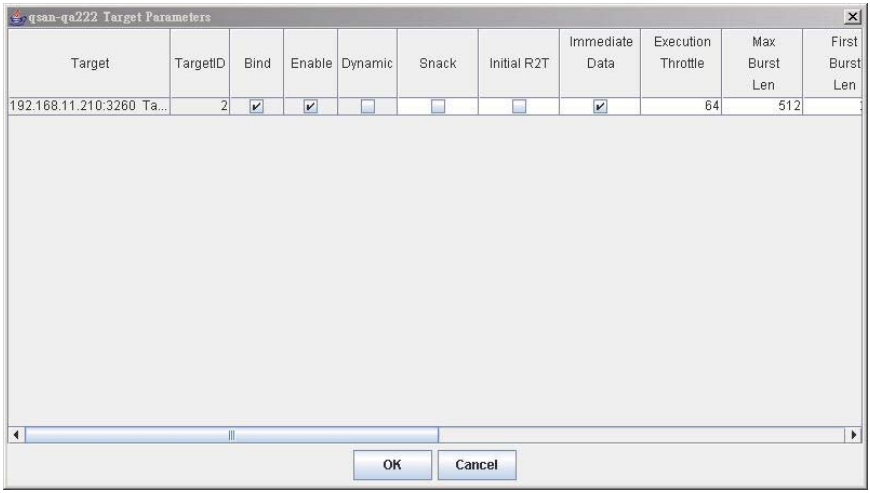


Figure F.3

• Click “OK”.

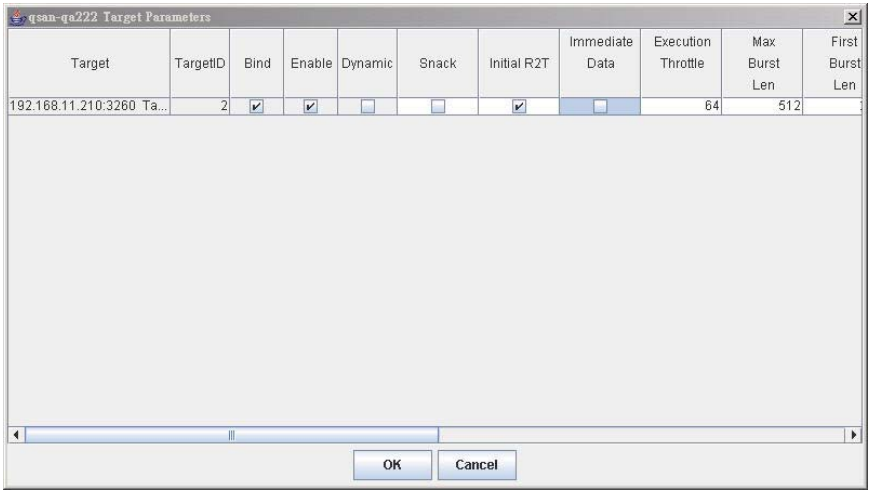


Figure F.4

• Click “Save settings” and click “Yes” on next page.

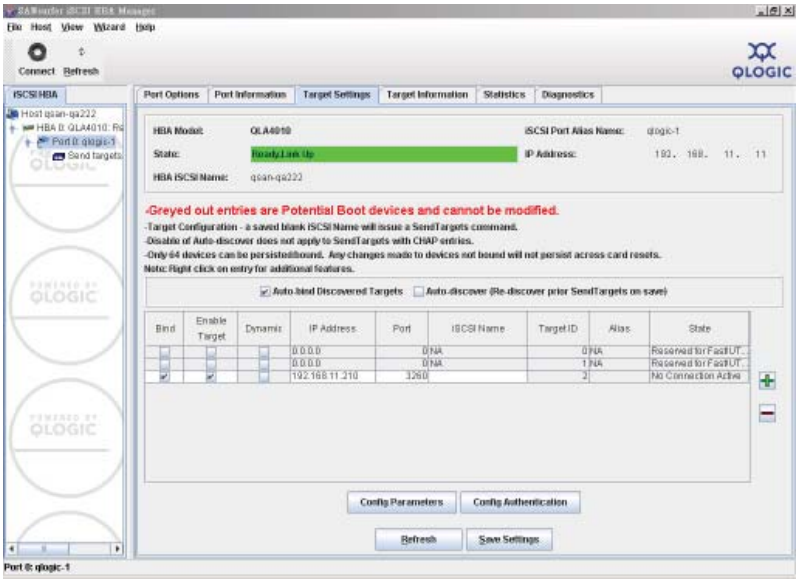
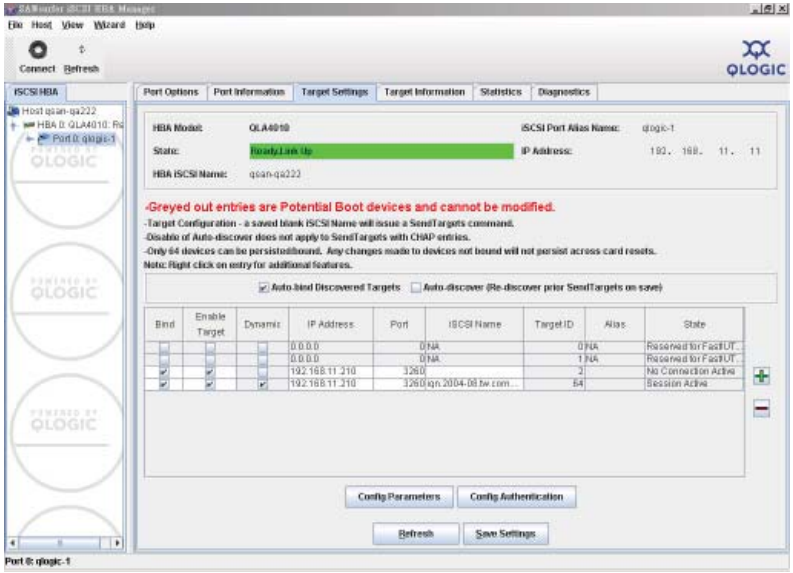


Figure F.5

• Click “Refresh” and find a new target with iSCSI name.



WWW.SANSDIGITAL.COM